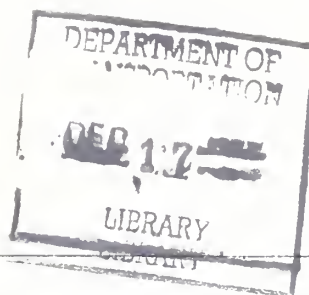


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US Department
of Transportation
**National Highway
Traffic Safety
Administration**



DOT HS 807 589
Supplement to Final Report

February 1990

Exploration of Impact Measures of Safety Belt Use Laws

Volume II: Literature Reviewed, Expert Team Comments on Indicators, and Indicator Catalog

The United States Government does not endorse products or manufactures. Trade or manufacturer's names appear only because they are considered essential to the object of this report.

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7. Author(s) Thomas W. Planeck, Alan F. Hoskin, Kevin T. Fearn, Terrence A. Miller, Kathryn E. H. Race, George S. Benjamin				8. Performing Organization Report No.	
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15. Supplementary Notes Volume I of this report contains specific and final project findings and recommendations. Volume II contains the detailed information on which these findings were based.					
16. Abstract This project identified, evaluated, and recommended indicators of safety belt use law (SBUL) impact (other than fatality reduction and observed belt usage) as well as institutional sources that collect them. The project involved an extensive literature review, an expert team, and a National Safety Council sponsored survey of data sources. Four indicators out of 52 candidates were judged to have the highest potential for assessing SBUL impacts: (1) the "KABC" injury scale used on police accident reports, (2) the Abbreviated Injury Scale used on medical records, and its derivative Injury Severity Score, (3) occupant ejections from vehicles, and (4) head and face injuries including cranium, brain, and concussive injuries but excluding ear and eye injuries. Two data sources out of 160 surveyed satisfied most of the 13 evaluation criteria. The Major Trauma Outcome Study appears useful for a multi-state, before-and-after study of SBUL impact. The National Electronic Injury Surveillance System could be adapted to gather national data to monitor future impacts of belt law revisions and other programmatic measures. The most promising long-term, state-level evaluation approach involves modifications of several data systems to link crash data in police accident reports with injury data in hospital medical records and trauma registries. Valid and reliable SBUL impact indicators are not immediately available from many existing sources and it is unlikely that they can be generated quickly. It is recommended that coordination and integration of data-gathering efforts at the national level should be given first priority. This volume of the final report contains (1) an annotated bibliography of the literature reviewed for the project, (2) expert team comments on the potential indicators, and (3) a catalog of profiles of all potential indicators considered.					
17. Key Words safety belts safety belt use laws traffic laws evaluation impact assessment		AIS KABC head injuries ejection trauma registries trauma		18. Distribution Statement Document is available to the U. S. public through the sponsoring agency (box 12) or NHTSA's Technical Reference Division.	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 22. Price	

Preface

This volume of "Exploration of Impact Measures of Safety Belt Use Laws" consists of supplemental material that was too bulky to include with the final project report in Volume I.

Part A is an annotated bibliography of all the literature reviewed. It is listed in alphabetical order by the authors' last names.

Part B is a summary of all of the comments made by the expert team on a list of candidate indicators sent to them early in the project. A summary of the expert team ratings of each indicator may be found in Volume I, Appendix D, and descriptions of the indicators may be found in Part C of this volume.

Part C is a catalog of candidate indicators considered for this project. Each candidate was rated by the project team on the profile features defined in Volume I, Appendix C. A ranked listing and summary of ratings by both the project team and the expert team may be found in Volume I, Appendix E.

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List of Abbreviations

AIS	Abbreviated Injury Scale
EMS	emergency medical services
ER	emergency room
E-code	external cause of injury (part of the ICD)
ICD	<u>International Classification of Diseases</u> , a manual used to classify diseases, injuries and causes of death.
ISS	Injury Severity Score
KABC	an injury code used for police accident reports: K-killed, A-incapacitating injury, B-nonincapacitating evident injury, C-possible injury
MAIS	maximum AIS severity score
MV	motor vehicle
MVA	motor-vehicle accident
NHTSA	National Highway Traffic Safety Administration

PART A

LITERATURE REVIEWED

[Documents are in alphabetical order by authors' names.]

document number	95	accession number	S-87-0523
reviewer	Benjamin	abstract only?	no

author	Agran, P.F. Dunkle, D.E. Winn, D.G.	year	1987
		volume	27
		number	1
		pages	58-64
		month or issue	

title	Injuries to a sample of seatbelted children evaluated and treated in a hospital emergency room
source	Journal of Trauma
publication place	

indicator desc.	AIS, body part distribution Head, spine, extremity, chest/abdomen children 9-hospital system
what was counted	persons injured, injuries
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	hospital records, ER records
body part(s) studied	head, spine, thoax, abdomen/pelvic contents, extremities/pelvis
severity coding	AIS, MAIS
miscellaneous related variables	crash configuration, belt use, vehicle parts, seating position, age
sbul link?	no
results desc.	tabulations of severity and body part for selected seat belt users, subdivided by age group 10-14 similar to adults seat belt use self-reported

source institution 9 hospital E.R.s and coroner's office in a California County

document number	99	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Allen, M.J. Barnes, M.R. Bodiwala, G.G.	year	1985
		volume	16
		number	7
		pages	471-476
		month or issue	July

title	The effect of seat belt legislation on injuries sustained by car occupants
source	Injury
publication place	

indicator desc.	injury patterns, 402 cases reviewed
	patterns of driver and front seat passengers pre- and post- measure of severity and site and type distributions of injuries sustained by belted and nonbelted drivers and passengers
what was counted	injuries
how it was reported	
how it was used	SBUL evaluation
source records	
body part(s) studied	
severity coding	
miscellaneous related variables	belt use, seating position
sbul link?	yes
results desc.	comparison of two groups 4 months before and after passage of law

source institution	
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document number	83	accession number	S-79-0520
reviewer	Benjamin	abstract only?	no

author	Andreasson, R. Roos, K.	year	1977
		volume	
		number	
		pages	
		month or issue	

title	Effects of Sweden's belt use law
-------	----------------------------------

source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine
publication place	

indicator desc.	body part: skull (-), face (-), chest (+), spine (+) percent of total injury ascribed to body part
-----------------	---

what was counted	ER visits
------------------	-----------

how it was reported	% distribution
---------------------	----------------

how it was used	safety belt effectiveness eval.
-----------------	---------------------------------

source records	EMS records
----------------	-------------

body part(s) studied	head, cranium, face, neck/throat, throat, spine, thorax, abdomen/pelvic, extremities/pelvis, upper extremities, lower extremities
----------------------	--

severity coding	
-----------------	--

miscellaneous related variables	belt use
---------------------------------	----------

sbul link?	yes
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results desc.	tabulation of seat belt use vs. non-seat belt use
---------------	---

source institution	16 collaborating hospitals in Sweden (listed)
--------------------	---

document number	54	accession number	S-88-1091
reviewer	Landes	abstract only?	no

author	Arajarui, E.	year	1988
		volume	20
		number	4
		pages	251-259
		month or issue	August

title A retrospective analysis of chest injuries in 280 seat belt wearers

source Accident Analysis and Prevention

publication place

indicator desc. examined chest injury fatalities of seat belt wearers in Finland between 1972 and 1985.
 ribs/sternum/pelvis
 chest wall

what was counted Injuries, accidents

how it was reported % distribution

how it was used safety belt effectiveness eval.

source records accident records

body part(s) studied thorax

severity coding AIS

miscellaneous related variables crash configuration, vehicle parts, belt-induced injury

sbul link? no

results desc. first listed chest injury patterns for fatally and severely injured seat belt wearers.
 Then looked at other related factors.

 chest injury mortality (-)
 seat belts less effective in lateral collisions

source institution Boards of Traffic Accident Investigation of the Insurance Companies (Finland)

document number	59	accession number	S-87-0682
reviewer	Fearn	abstract only?	no

author	Arajarvi, E. Santavirta, S. Tolonen, J.	year	1987
		volume	27
		number	4
		pages	393-397
		month or issue	April

title	Abdominal injuries sustained in severe traffic accidents by seatbelt wearers		
source	Journal of Trauma		
publication place			

indicator desc.	injury caused by belts in various crash scenarios abdomen/pelvic contents		
what was counted	accidents, injuries		
how it was reported	% distribution, number		
how it was used	safety belt effectiveness eval.		
source records	accident records, hospital records		
body part(s) studied	head, brain, spine, cervical, thoracic, lumbar, thorax, heart/lung, chest wall, ribs, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities		
severity coding			
miscellaneous related variables	crash configuration, seating position, belt-induced injury, vehicle parts, injury type, accident type, belt use		
sbul link?	no		
results desc.	analysis of severe traffic accidents over an 11-year period in Finland to assess the role of seatbelt wearing on the injury profile decrease in fatalities and severe injuries		

source institution	University Central Hospital, Helsinki, Finland
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document number	82	accession number	S-86-0184
reviewer	Benjamin	abstract only?	no

author	Backaitis, S.H. Dalmotas, D.	year	1985
		volume	
		number	
		pages	
		month or issue	

title	Injury patterns and injury sources of unrestrained an three point belt restrained car occupants in injury producing frontal collisions
source	29th Annual Proceedings of the American Association for Automotive Medicine, Oct. 1985, Washington, DC
publication place	

indicator desc.	AIS > or = 2, body segment injuries head (-), face (-), chest(+), abdomen (+)
what was counted	injuries
how it was reported	% distribution, rates
how it was used	safety belt effectiveness eval.
source records	accident records
body part(s) studied	head, face, neck/throat, neck, thorax, chest wall, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities, pelvis
severity coding	AIS
miscellaneous related variables	crash configuration, seating position, vehicle parts
sbul link?	no
results desc.	injury index ratio of injuries to given part to all injuries at same severity level

source institution	Canadian Restrained Occupant Injury File 1983 NASS
--------------------	---

document number	102	accession number	S-77-0426
reviewer	Race	abstract only?	no

author	Baird, J. Sublett, F. Hughes, R. Didion, J. Stoddard, J. Wheatley, D. et. al.	year volume number pages month or issue	1977
title	Restraint systems evaluation program		
source	National Highway Traffic Safety Administration		
publication place			

indicator desc.	injury patterns police, hospital, AIS data
what was counted	persons injured
how it was reported	
how it was used	other evaluation, air bag
source records	special accident investigations
body part(s) studied	head, face, neck/throat, neck, spine, thoracic, lumbar, thorax, chest wall, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities, pelvis
severity coding	AIS, OIC
miscellaneous related variables	type of vehicle, ejection, belt use, crash configuration, seating position, age, sex, alcohol
sbul link?	no
results desc.	to evaluate accident data may be outdated given age of study

source institution	Institute of Safety and System Management University of Southern California
--------------------	--

document number	105	accession number	S-82-0131
reviewer	Landes	abstract only?	no

author	Beier, G. Schuller, E. Spann, W.	year	1981
		volume	
		number	
		pages	
		month or issue	

title Risk and effectiveness of seat belts in Munich area automobile accidents

source Proceedings of the 25th STAPP Car Crash Conference, Sept. 1981, San Francisco, Society of Automotive Engineers

publication place

indicator desc. belt effectiveness
 measured as the severity of actually sustained injuries compared to expected injuries without belts

what was counted injuries

how it was reported % distribution, number

how it was used safety belt effectiveness eval.

source records accident records

body part(s) studied

severity coding AIS

miscellaneous related variables crash configuration, belt use

sbul link? no

results desc. using the effectiveness measure, different directions of impact were examined
 seat belts reduced number of non-minor, non-fatal injured occupants. Injury severity also reduced.

source institution

document number	113	accession number	?-79-2632
reviewer	Benjamin	abstract only?	no

author	Bohlin, N.	year	1977
		volume	
		number	
		pages	
		month or issue	

title Fifteen years with 3 point safety belts

source Proceedings of the 6th International Conference of the International Association of
Accident and Traffic Medicine

publication place

indicator desc. AIS 3-6 (p.147)

what was counted injuries

how it was reported number

how it was used safety belt effectiveness eval.

source records corporate records

body part(s)
studied

severity coding AIS

miscellaneous
related variables crash configuration, belt use

sbul link? no

results desc. tabulated frequency

source institution Volvo Company, Sweden

document number 122
reviewer Miller

accession number
abstract only? ILL
no

author Bohlin, N.I.

year 1979
volume
number
pages
month or issue

title Twenty years of safety belt experience and the effect of safety belt legislation in Sweden

source 1979 International Symposium on Seat Belts in Tokyo

publication place

indicator desc.

what was counted injuries

how it was reported % distribution

how it was used safety belt effectiveness eval., SBUL evaluation

source records corporate records, accident records

body part(s) studied thorax, head

severity coding AIS

miscellaneous related variables belt use

sbul link? yes

results desc. injury reducing effect-- average 24 % (AIS 1-2), 68% (AIS 3-6)

source institution

document number	33	accession number	C-77-1947
reviewer	Benjamin	abstract only?	no

author	Briner, A.M.	year	1976
		volume	1
		number	
		pages	912-914
		month or issue	June

title	Penetrating eye injuries associated with motor vehicle accidents		
source	Medical Journal of Australia		
publication place			

indicator desc.	penetrating eye injuries full thickness global laceration eye injuries (incidence/nature) (-) partial or permanent loss of visual acuity (-)		
what was counted	injuries		
how it was reported	% distribution, number		
how it was used	safety belt effectiveness eval.		
source records	hospital records, ER records, inpatient records		
body part(s) studied	face, eye		
severity coding			
miscellaneous related variables	belt use		
sbul link?	yes		
results desc.	Tabulates each case as to use of restraint. Only 3 out of 24 used restraints and 2 incomplete. Annual decline in penetrating eye injuries despite increase in driver registrations. 24 cases in 2.5 year period. 17 cases/year before seat belt legislation 9.6 cases/year after		

source institution	Princess Alexandra Hospital, Brisbane, Australia
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document number	58	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Budd, J.S.	year	1985
		volume	291
		number	6498
		pages	785
		month or issue	Sept. 21

title	Effect of seat belt legislation on the incidence of sternal fractures seen in the accident department
source	British Medical Journal
publication place	

indicator desc.	citation only, need original
	ribs/sternum/pelvis
	bruised/fractured sternum

what was counted	ER visits
------------------	-----------

how it was reported	
---------------------	--

how it was used	SBUL evaluation
-----------------	-----------------

source records	
----------------	--

body part(s) studied	sternum
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severity coding	
-----------------	--

miscellaneous related variables	
---------------------------------	--

sbul link?	yes
------------	-----

results desc.	
---------------	--

source institution	
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document number	88	accession number	S-79-0529
reviewer	Benjamin	abstract only?	no

author	Cameron, M.H. Nelson, P.G.	year	1977
		volume	
		number	
		pages	
		month or issue	

title	Injury patterns with and without seat belts
-------	---

source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine
publication place	

indicator desc.	AIS, injury to body parts types of injury in fatalities: fracture of vault of skull, brain damage, aorta damage. types of injuries in survivors: concussion (-), pneumothorax (-), whiplash (+), transient Cx cord damage (+), kidney (-)
-----------------	--

what was counted	persons injured, injuries
------------------	---------------------------

how it was reported	% distribution
---------------------	----------------

how it was used	safety belt effectiveness eval.
-----------------	---------------------------------

source records	hospital records, coroner's records
----------------	-------------------------------------

body part(s) studied	head, spine, thorax, abdomen/pelvic contents, extremities/pelvis
----------------------	--

severity coding	
-----------------	--

miscellaneous related variables	crash configuration, ejection, belt use, seating position
---------------------------------	---

sbul link?	no
------------	----

results desc.	distribution of injury types as percentage of total seat belt vs. nonseat belt. Further breakdown by type of belt, location 6,526 cases, very comprehensive article. Some indicators dependent on type of impact and age. more fatality indicators, Table III, p.452
---------------	---

source institution	Royal Australasian College of Surgeons Pattern of Injury Survey Victorian road casualties taken from all hospitals in Victoria, post mortem reports, and ambulance reports
--------------------	--

accession number	ILL
abstract only?	no

author Campbell, B.J.

year 1979
volume
number
pages
month or issue

title	Seat belt effectiveness
-------	-------------------------

source 1979 International Symposium on Seat Belts in Tokyo

publication place

indicator desc.

what was counted injuries

how it was reported	number
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	1
20	1
21	1
22	1
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88	1
89	1
90	1
91	1
92	1
93	1
94	1
95	1
96	1
97	1
98	1
99	1
100	1

how it was used safety belt effectiveness eval.

source records accident records

body part(s)
studied

severity coding

miscellaneous belt use
related variables

```

sbul link?      no

```

results desc.	65 % reduction in serious and fatal injuries for belt wearers compared to expected based on experience of nonbelt wearers
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source institution

document number	18	accession number	Gurin
reviewer	Miller	abstract only?	no

author	Campbell, B.J. Campbell, F.A.	year volume number pages month or issue
--------	----------------------------------	---

title	Casualty reduction and belt use associated with occupant restraint laws
-------	---

source	University of North Carolina Highway Safety Research Center
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publication place	Chapel Hill, North Carolina
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indicator desc.	number of injuries in certain states before and after law N.C. injuries broken down by severity (some other states also).
-----------------	--

	number of injuries provided from state records
--	--

	effects of SBULs in Illinois, Michigan, N.Carolina, Texas, New York
--	--

what was counted	injuries
------------------	----------

how it was reported	number
---------------------	--------

how it was used	SBUL evaluation
-----------------	-----------------

source records	accident records
----------------	------------------

body part(s) studied	
----------------------	--

severity coding	
-----------------	--

miscellaneous related variables	seating position, belt use
---------------------------------	----------------------------

sbul link?	yes
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results desc.	time series used. positive effect., in at least one state Tex., N.Y., N.C., Mich., Ill.: number of injuries/moderate, serious or all (-) estimated 10 % improvement overall in injury due to SBULs
---------------	--

source institution	traffic data sources in Illinois, Michigan, N. Carolina, Texas, and New York
--------------------	--

document number	77	accession number	C-87-1743
reviewer	Fearn	abstract only?	no

author	Campbell, B.J. Campbell, F.A.	year	1986
		volume	
		number	
		pages	
		month or issue	

title	Seat belt laws in four foreign countries compared to the United States
source	AAA Foundation for Public Safety
publication place	Falls Church, Virginia

indicator desc.	expected vs. actual number of moderate to fatal injuries in North Carolina effectiveness evaluation
what was counted	persons involved, injuries
how it was reported	number
how it was used	safety belt effectiveness eval., SBUL evaluation
source records	accident records
body part(s) studied	
severity coding	
miscellaneous related variables	
sbul link?	yes
results desc.	to assess the effectiveness of the North Carolina belt law decrease in observed post belt law injuries and fatalities compared to predicted

source institution	University of North Carolina
--------------------	------------------------------

document number	110	accession number	S-87-0401
reviewer	Benjamin	abstract only?	no

author	Campbell, B.J. Campbell, F.A.	year	1986
		volume	
		number	
		pages	
		month or issue	

title	Early results of seat belt legislation in the United States of America
source	Proceedings of the IRCOBI Conference, 1986
publication place	

indicator desc.	injury severity, no injury, minor, moderate, serious, fatal police officer rating, guidelines not defined
what was counted	persons involved, accidents
how it was reported	% distribution, number
how it was used	SBUL evaluation
source records	accident records
body part(s) studied	
severity coding	KABC
miscellaneous related variables	type of vehicle
sbul link?	yes
results desc.	tabulates moderate and severe injuries before and after law 12-15 % drop

source institution	State of North Carolina Police Crash Reports Highway Safety Research Center University of North Carolina
--------------------	--

document number	74	accession number	C-84-2825
reviewer	Benjamin	abstract only?	no

author	Carlsson, G.	year	1983
		volume	4
		number	2
		pages	122-125
		month or issue	

title	Ejection--a hazard in traffic accidents
source	International Journal of Vehicle Design
publication place	

indicator desc.	removed from interior of car, may be partially through open door
	EMS reports ejections
what was counted	injury episodes
how it was reported	% distribution
how it was used	safety belt effectiveness eval.
source records	corporate records
body part(s) studied	
severity coding	
miscellaneous related variables	crash configuration, seating position, ejection, belt use
sbul link?	no
results desc.	tabulation by type of impact. Only 2 belt users in 90 cases

source institution	
--------------------	--

document number	44	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Carter, R.E.	year	1977
		volume	70
		number	6
		pages	709-710
		month or issue	June

title	Traumatic spinal cord injuries due to automobile accidents
source	Southern Medical Journal
publication place	

indicator desc.	spinal cord injuries lead to rehabilitation
	spine injuries
	rehabilitation

what was counted	persons injured
------------------	-----------------

how it was reported	% distribution, number
---------------------	------------------------

how it was used	case reports
-----------------	--------------

source records	hospital records, inpatient records
----------------	-------------------------------------

body part(s) studied	spine
----------------------	-------

severity coding	
-----------------	--

miscellaneous related variables	crash configuration, belt use, seating position
---------------------------------	---

sbul link?	no
------------	----

results desc.	389 cases from motor vehicle accidents.
	90 % had no seat belt
	don't know use in general population

source institution	Texas Institute for Rehabilitation and Research
--------------------	---

document number	64	accession number	Gurin
reviewer	Race	abstract only?	no

author	Champion, H.R. Copes, W.S. Craig, M. Morelli, S. Keast, S. Bain, L.	year volume number pages month or issue	1986
title	Preliminary study of head and neck trauma of automobile crashes and their consequences		
source	National Highway Traffic Safety Administration		
publication place			

indicator desc.	carefully matched medical and biomechanical data health care
what was counted	injuries
how it was reported	
how it was used	epidemiological studies
source records	hospital records, accident records, special crash investigations
body part(s) studied	head, brain, face, neck/throat,
severity coding	AIS
miscellaneous related variables	
sbul link?	no
results desc.	101 injury cases. Outcome norms: determine whether number of survivors is greater, less than or about the same as expected.

source institution	Research Foundation of the Washington Health Care Corp. Washington Hospital Center Corporation 110 Irving Street, N.W. Washington, DC 20010
	Note: American College of Surgeons Committee on Trauma, 89 hospitals, submit detailed injury data, 35,000 cases

document number	53	accession number	S-88-1376
reviewer	Fearn	abstract only?	no

author	Chetcuti, P. Levene, M.I.	year	1987
		volume	15
		number	
		pages	207-209
		month or issue	

title	Seat belts: a potential hazard to the fetus
source	Journal of Perinatal Medicine
publication place	

indicator desc.	separation of the placenta from the uterine wall due to impact with lap belt abdominal injuries
what was counted	
how it was reported	
how it was used	case reports
source records	hospital records, ER records
body part(s) studied	abdomen/pelvic contents
severity coding	
miscellaneous related variables	belt-induced injury, seating position, belt use
sbul link?	no
results desc.	seat belt use, even in low speed collisions, warrants rapid assess in the case of the pregnant occupant to allow for possible resuscitation of the fetus increase in injuries to the abdomen/pelvic contents of pregnant occupants

source institution	Neonatal Unit, Department of Child Health, Leicester University School of Medicine, Leicester, United Kingdom
--------------------	---

document number	80	accession number	NSC
reviewer	Benjamin	abstract only?	no

author	Chorba, T.L. Reinfurt, D. Hulka, B.	year	1988
		volume	260
		number	24
		pages	3593-3597
		month or issue	Dec.23/30

title	Efficacy of mandatory seat-belt use legislation: the North Carolina experience from 1983 through 1987
source	Journal of the American Medical Association
publication place	

indicator desc.	uses police report to classify none, mild, moderate, severe
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what was counted	persons injured
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how it was reported	% distribution
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how it was used	SBUL evaluation
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source records	accident records
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body part(s) studied	
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severity coding	
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miscellaneous related variables	crash configuration, seating position, belt use
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sbul link?	yes
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results desc.	tabulates rate of injury class on percentage of total accidents
	significant reductions in severe and fatal injuries among front-seat car occupants.
	HSRC data

source institution	School of Public Health University of North Carolina
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document number	119	accession number	ILL
reviewer	Miller	abstract only?	no

author	Christian, M.S.	year	1984
		volume	289
		number	
		pages	1525-1526
		month or issue	Dec. 1

title	Morbidity and mortality of car occupants: comparative survey over 24 months
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source	British Medical Journal
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publication place	
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indicator desc.

what was counted hospital admissions, hospital stays, injuries

how it was
reported scores

how it was used SBUL evaluation

source records hospital records

body part(s)
studied

severity coding ISS

miscellaneous
related variables seating position, ejection, alcohol

sbul link? yes

results desc. mean injury severity score reduced from 4.104 for 12 months before UK SBUL to 2.17 for 12 months after

source institution

document number	34	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Cole, M.D. Clearkin, L. Dabbs, T. Smerdon, D.	year	1987
		volume	71
		number	6
		pages	436-440
		month or issue	June

title	The seat belt law and after
source	British Journal of Ophthalmology
publication place	

indicator desc.	perforating eye injuries (incidence/nature) (-)
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what was counted	injuries
------------------	----------

how it was reported	number
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how it was used	safety belt effectiveness eval.
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source records	hospital records, ER records, inpatient records
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body part(s) studied	face, eye
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severity coding	
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miscellaneous related variables	belt use
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sbul link?	yes
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results desc.	378 serious eye injuries. Asserted that seat belt legislation reduces serious eye injuries
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source institution	
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document number	45	accession number	Gurin
reviewer	Race	abstract only?	no

author	Colorado Department of Health	year	1987
		volume	
		number	
		pages	
		month or issue	

title	Annual report of the spinal cord injury Early Notification System (ENS)
source	Colorado Department of Health
publication place	Denver, Colorado

indicator desc.	hospitalization cost, causes/levels spine injuries
what was counted	persons injured, injuries, costs
how it was reported	
how it was used	epidemiological studies, demographics
source records	hospital records
body part(s) studied	spine
severity coding	ICD, (9CM), E-codes
miscellaneous related variables	
sbul link?	no
results desc.	76 mv cases. Hospitalized over 6500 days. \$6.5 million spent for 1987 Colorado spinal cord injury survivors. ages 16-45, comprehensive surveillance program funded by a grant from National Institute of Disability and Rehabilitation Research (reported as collecting data)

source institution	Spinal Cord Injury Early Notification System (ENS) Division of Prevention Programs, Colorado Department of Health 4210 East 11th Avenue, Denver, Colorado 80220 (303) 331-8344 collaboration of Colorado Department of Health, Wyoming Hospital Association, 42 Colo./Wyo. hospitals
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document number 14
reviewer Miller

accession number S-75-1037
abstract only? no

author Commonwealth Bureau of Census and Statistics, Victoria Office
year 1973
volume
number
pages
month or issue

title Report on a statistical investigation into the effectiveness of seatbelts in motor-vehicle accidents

source Commonwealth Bureau of Census and Statistics, Victoria Office

publication place

indicator desc. ratio of injured to noninjured drivers for seat belts vs. nonseat belt wearers; number of injuries before and after the law in Australia

what was counted injuries

how it was reported number

how it was used safety belt effectiveness eval., SBUL evaluation

source records accident records

body part(s) studied

severity coding

miscellaneous related variables

sbul link? yes

results desc. number of injuries was compared to expected values using time series; data from Australian state of Victoria

serious injuryies (-), number of injuries (-)

source institution Commonwealth Bureau of Census and Statistics

document number	61	accession number	B-81-0025
reviewer	Landes	abstract only?	no

author	Dagnone, L.E. Siu, T.O.	year	1981
		volume	
		number	
		pages	
		month or issue	

title	The effect of seat belt use on the demand for medical services
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source	Proceedings of the International Symposium on Occupant Restraints, Toronto, Ontario, Canada, June, 1981, A.A.A.M.
publication place	Morton Grove, Illinois

indicator desc.	includes counts of initial ambulance runs, physician assessment, required ER services and neurosurgical consultations
	trauma/ER

what was counted	ambulance runs, ER visits, hospital stays, hospital admissions, medical procedures, doctor visits, clinic visits, disability days
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how it was reported	number, rates
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how it was used	safety belt effectiveness eval.
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source records	hospital records, EMS records
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body part(s) studied	
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severity coding	disability days
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miscellaneous related variables	disability days
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sbul link?	yes
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results desc.	The demand for medical services was measured before and after belt use laws in Ontario (1975/1976)
	ambulance runs (-), physician assessment (-), ambulance transfers(-), hospital admissions(-), inpatient medical services (-), neurosurgical consultations and surgical operations (-), outpatient services (-), lost time or disability time (+/-)

source institution	
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document number	106	accession number	S-80-0840
reviewer	Landes	abstract only?	no

author	Dalmotas, D.J.	year	1980
		volume	
		number	
		pages	
		month or issue	

title	Mechanisms of injury to vehicle occupants restrained by three-point seat belts
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source	Proceedings of the 24th STAPP Car Crash Conference, Oct. 1980, Troy, Mich., Society of Automotive Engineers
publication place	

indicator desc.	general injuries, injuries of all body regions to front seat belted occupants (all collision types)
-----------------	--

what was counted	accidents, injuries
------------------	------------------------

how it was reported	% distribution, number
---------------------	---------------------------

how it was used	safety belt effectiveness eval.
-----------------	---------------------------------

source records	accident records, hospital records
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body part(s) studied	head, neck, face, spine, thorax, chest wall, abdomen, extremities/pelvis, upper extremities, lower extremities, pelvis
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severity coding	AIS
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miscellaneous related variables	crash configuration, vehicle parts, seating position, type of vehicle
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sbul link?	no
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results desc.	a large number of variables were examined including nature of impact, body region, AIS severity, type of injury 3-point belts afford front seat occupants excellent protection against fatal or life threatening injuries
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source institution	Dainius J. Dalmotas Vehicle Systems Division Road and Motor Vehicle Traffic Safety Branch Transport Canada
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document number	115	accession number	S-87-0770
reviewer	Fearn	abstract only?	no

author	Deans, G.T.	year	1987
	Magalliard, J.N.	volume	18
	Kerr, M.	number	1
	Rutherford, W.H.	pages	10-12
		month or issue	January

title Neck sprains--a major cause of disability following car accidents

source Injury

publication place

indicator desc. neck sprains,
pain in the neck area following a motor vehicle accident
noncontact soft tissue neck injuries
neck injuries (incidence/nature)

what was counted injuries

how it was reported % distribution, number

how it was used other evaluation

source records hospital records

body part(s) studied neck/throat, neck

severity coding

miscellaneous related variables crash configuration, belt use, seating position

sbul link? no

results desc. explored the time course of onset of neck pain,
many times unreported at hospital due to late onset,
many more sprains were found to occur among belted occupants

neck (+)

patients wearing belts experienced neck pain more frequently than unbelted patients

source institution Royal Victoria Hospital, Belfast, Northern Ireland

document number	39	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Deans, G.T.	year	1986
	McGalliard, J.N.	volume	292
	Rutherford, W.H.	number	6513
		pages	94-95
		month or issue	Jan. 11

title	Incidence and duration of neck pain among patients injured in car accidents
source	British Medical Journal
publication place	

indicator desc.	abstract-get original
	neck injuries

what was counted

how it was reported

how it was used

source records

body part(s) studied

severity coding

miscellaneous related variables

sbul link?

results desc.

source institution

document number	50	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Denis, R.	year	1983
	Allard, M.	volume	23
	Atlas, H.	number	11
	Farkouh, E.	pages	1007-1008
		month or issue	November

title	Changing trends with abdominal injury in seatbelt wearers		
source	Journal of Trauma		
publication place			

indicator desc.	gastrointestinal injury(+) surgical diagnosis abdominal injuries		
what was counted	persons injured		
how it was reported	number		
how it was used	case reports		
source records	hospital records, inpatient records		
body part(s) studied	abdomen/pelvic contents		
severity coding			
miscellaneous related variables	belt use		
sbul link?	no		
results desc.	case reports. 32 patients. 27 of 32 using 3 point belts		

source institution	l'Hopital du Sacre-Coeur		
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document number 24
reviewer Miller

accession number C-76-2710
abstract only? no

author Einar-Nilsson, L.

year 1976
volume
number
pages
month or issue

title Restraint system effectiveness

source U.S. D.O.T. National Motor Vehicle Safety Advisory Council Motor Vehicle Safety Seminar

publication place

indicator desc. number of injuries by AIS, frequency of injury for head, spinal, chest and others.
experience of SAAB cars in Sweden following SBUL in Sweden.

what was counted injuries

how it was reported % distribution, number

how it was used SBUL evaluation

source records corporate records

body part(s) studied head, face, spine, thorax

severity coding AIS

miscellaneous related variables belt-induced injury, vehicle parts, belt use

sbul link? yes

results desc. for many types of injuries, found that frequency was not reduced but severity was
minor injuries (-), moderate injuries (-), severe injuries (-), number of injuries (-),
head (-), spine (+), chest (+), face (-)

source institution SAAB, Sweden

document number	118	accession number	ILL
reviewer	Miller	abstract only?	no

author	Epstein, H.C.	year	1985
	Wiss, D.A.	volume	
	Cozen, L.	number	201
		pages	9-17
		month or issue	December

title	Posterior fracture dislocation of the hip with fractures of the femoral head
source	Clinical Orthopaedics and Related Research
publication place	

indicator desc.

what was counted injuries

how it was
reported

how it was used case reports

source records hospital records

body part(s)
studied extremities/pelvis, pelvis

severity coding

miscellaneous
related variables

sbul link? no

results desc. "First priority in prevention of traumatic dislocation of the hip is mandatory use of seat belts, because 80 % of these dislocations were the result of dashboard injuries."

source institution Univeristy of Southern California, Los Angeles

document number	56	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Evans, P.D. Mackie, I.G.	year	1985
		volume	16
		number	7
		pages	485-486
		month or issue	

title	Fracture of the body of the sternum associated with the use of static seat belts
source	Injury
publication place	

indicator desc.	4 case reports ribs/sternum/pelvis bruised/fractured sternum
what was counted	injuries
how it was reported	
how it was used	case reports
source records	hospital records
body part(s) studied	thorax, sternum
severity coding	
miscellaneous related variables	belt use
sbul link?	no
results desc.	case reports

source institution	Cardiff Royal Infirmary
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document number	16	accession number	S-85-0365
reviewer	Miller	abstract only?	no

author	Freedman, L.S.	year	1984
		volume	16
		number	1
		pages	60-62
		month or issue	November

title	Initial assessment of the effect of the compulsory use of seat belts on car occupants' injuries, and the Trauma Department work-load		
source	Injury		
publication place			

indicator desc.	number of injuries seen by ER before and after law, distribution by severity and part of body		
what was counted	injuries		
how it was reported	% distribution		
how it was used	SBUL evaluation		
source records	hospital records, ER records, inpatient records		
body part(s) studied	head, face, neck/throat, neck, abdomen/pelvic contents, extremities/pelvis		
severity coding			
miscellaneous related variables	seating position, belt use, age		
sbul link?	yes		
results desc.	before and after law; comparable 3 month periods in 1982-1983 from English hospital head (-), face (-), whiplash (+)		

source institution	Royal Berkshire Hospital, Reading, England
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document number	78	accession number	S-87-0155
reviewer	Benjamin	abstract only?	no

author	Friedel, B. Marburger, E.A.	year volume number pages month or issue	1986
title	Belt usage rates in the Federal Republic of Germany and their medical consequences		
source	30th Annual Proceedings of the American Association for Automotive Medicine, Oct., 1986, Montreal, Quebec		
publication place			

indicator desc.	AIS > 1
what was counted	hospital admissions, hospital stays, injuries, clinic visits
how it was reported	% distribution, number
how it was used	SBUL evaluation
source records	special studies
body part(s) studied	head, eye, face, neck/throat, neck, spine, thoracic, thorax, sternum, ribs, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities
severity coding	AIS
miscellaneous related variables	
sbul link?	yes
results desc.	overall injuries down (results also listed by body part). reduction in hospital admissions. eye injuries down.

source institution	
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document number	28	accession number	C-85-2056
reviewer	Landes	abstract only?	no

author	Gloyns, R.F.	year	1981
	Rattenbury, S.J.	volume	
	Rivlin, A.Z.	number	
	Hayes, H.R.M.	pages	
	Hanstead, J.K.	month or issue	
	Proctor, S.		

title	Steering wheel induced head and facial injuries amongst drivers restrained by seat belts
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source	Proceedings of the 6th International IRCOBI Conference
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publication place	
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indicator desc.	head (except face, eye), face (except eye)
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what was counted	injury episodes, drivers involved
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how it was reported	% distribution, number
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how it was used	epidemiological studies, other evaluation
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source records	accident records
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body part(s) studied	head, face
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severity coding	
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miscellaneous related variables	injury type, vehicle parts
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sbul link?	
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results desc.	
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source institution	
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document number	32	accession number		DIALOG
reviewer	Benjamin	abstract only?		yes

author	Glynn, R.J. Seddon, J.M. Berlin, B.M.	year	1988
		volume	106
		number	6
		pages	785-789
		month or issue	

title	The incidence of eye injuries in New England adults
source	Arch. Ophthalmol.
publication place	

indicator desc.	Random population, telephone survey eye injuries (incidence/nature) (-)
what was counted	injuries
how it was reported	% distribution, rates
how it was used	epidemiological studies
source records	random telephone survey
body part(s) studied	face, eye
severity coding	
miscellaneous related variables	belt use
sbul link?	
results desc.	Rate up in non-seat belt users (self-reported). Not significant. Only 26 cases in whole sample. denominator of rate: population

source institution	
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document number	11	accession number	S-74-0238
reviewer	Miller	abstract only?	no

author	Griffin, L.	year	1973
		volume	
		number	
		pages	
		month or issue	

title	Analysis of the benefits derived from certain presently existing motor-vehicle safety devices: a review of the literature
source	University of North Carolina Highway Safety Research Center
publication place	Chapel Hill

indicator desc.	distribution of injuries for belted vs. unbelted by AIS level (driver and passenger)
	literature review, summary of other studies

what was counted	injuries
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how it was reported	% distribution
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how it was used	safety belt effectiveness eval.
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source records	
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body part(s) studied	
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severity coding	AIS, KABC
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miscellaneous related variables	belt-induced injury, belt use
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sbul link?	no
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results desc.	reported on Swedish data, Australian data, N.Carolina data
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source institution	cited other data sources
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document number	13	accession number	C-80-0374
reviewer	Miller	abstract only?	no

author	Grime, G.	year	1979
		volume	11
		number	
		pages	293-306
		month or issue	December

title	A review of research on the protection afforded to occupants of cars by seat belts which provide upper torso restraint		
source	Accident Analysis and Prevention		
publication place			

indicator desc.	head, neck, chest, spine, abdomen, etc. % injured summary of other research		
what was counted	injuries		
how it was reported	rates		
how it was used	safety belt effectiveness eval., SBUL evaluation		
source records			
body part(s) studied	head, neck/throat, neck, spine, thorax, abdomen/pelvic contents		
severity coding	AIS		
miscellaneous related variables			
sbul link?	no		
results desc.	literature review and some discussion of Australian SBUL looked at fatalities and overall serious injuries estimated reduction of serious injuries with belt use (45 to 70 %) number of injuries from SBUL in Australia (-)		

source institution	
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document number	97	accession number	C-78-1203
reviewer	Benjamin	abstract only?	no

author	Grime, G.	year	1975
		volume	
		number	
		pages	
		month or issue	

title	Head and neck injuries to car occupants wearing safety belts in frontal collisions
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source	2nd International Conference of the International Research Committee on the Biokinetics of Impacts
publication place	

indicator desc.	severity (not AIS). Body part: head and face, neck, shoulder, chest and ribs, internal organs, arms, legs and knees, cuts and bruises
	body part class vs. minor, moderate severe
	seatbelt wearers only

what was counted	accidents, injuries
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how it was reported	number
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how it was used	other evaluation
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source records	corporate records, seat belt wearer reports
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body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis
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severity coding	
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miscellaneous related variables	crash configuration, belt-induced injury, belt use, speed
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sbul link?	no
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results desc.	tabulation of number of injuries by body part and severity and velocity of impact
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source institution	Traffic Studies Group, London
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document number	38	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Guertler, A.T.	year	1988
		volume	17
		number	8
		pages	838-839
		month or issue	August

title	Blunt laryngeal trauma associated with shoulder harness use
source	Ann. Emerg. Med.
publication place	

indicator desc.	neck injuries laryngeal injury blunt laryngeal trauma, laceration from shoulder belt 1 case
what was counted	ER visits
how it was reported	
how it was used	case reports
source records	hospital records, ER records, inpatient records
body part(s) studied	neck/throat, throat
severity coding	
miscellaneous related variables	belt use
sbul link?	no
results desc.	case report

source institution	Madigan Army Medical Center, Tacoma, Washington
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document number	43	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Hadley, M.N. Sonntag, V.K.H. Graham, T.W.	year	1986
		volume	11
		number	9
		pages	861-864
		month or issue	

title	Axis fractures resulting from motor vehicle accidents. The need for occupant restraints		
source	Spine		
publication place			

indicator desc.	C2 fractures, persons thrown to back seat. 1 out of 30 had seat belt. Note: more than 30 cases. 78 vehicle cases but records incomplete spine injuries ejection		
what was counted	persons injured		
how it was reported	% distribution, number		
how it was used	case reports		
source records	hospital records, inpatient records		
body part(s) studied	cervical, spine		
severity coding			
miscellaneous related variables	ejection, belt use		
sbul link?	no		
results desc.	case reports with seat belt use, associated often with head injury. contradicts article on hangman's noose dramatically (Lesoin et al.)		

source institution	Barrow Neurological Institute, Phoenix, Arizona
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document number	55	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Hamilton, J.R.L. Dearden, C. Rutherford, W.H.	year	1984
		volume	16
		number	3
		pages	155-156
		month or issue	

title	Myocardial contusion associated with fracture of the sternum: important features of the seat belt syndrome
source	Injury
publication place	

indicator desc.	ribs/sternum/pelvis myocardial contusion bruised/fractured ribs
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what was counted	injuries
------------------	----------

how it was reported	
how it was used	case reports
source records	hospital records

body part(s) studied	thorax, heart/lung, sternum
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severity coding	
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miscellaneous related variables	belt use
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sbul link?	no
results desc.	3 case reports

source institution	
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document number	41	accession number	S-86-1058
reviewer	Fearn	abstract only?	no

author	Hampson, S. Coombs, R. Hemingway, A.	year	1984
		volume	57
		number	
		pages	1033-1034
		month or issue	November

title	Fractures of the upper thoracic spine--an addition to the "seat-belt" syndrome
source	British Journal of Radiology
publication place	

indicator desc.	Spinal cord prone to injuries where the relatively mobile cervical spine is attached to relatively fixed thoracic spine. single case report
what was counted	
how it was reported	
how it was used	case reports
source records	hospital records, ER records
body part(s) studied	spine, thoracic
severity coding	
miscellaneous related variables	belt-induced injury, belt use
sbul link?	no
results desc.	It was used to support the position that radiographic examinations following mv accidents should be extended to include views of the upper thoracic region. increase in neck injuries in those wearing seat belts at time of accident

source institution	Royal Postgraduate Medical School & Hammersmith Hospital, England
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document number	22	accession number	C-84-1311
reviewer	Miller	abstract only?	no

author	Hartemann, F. Henry, C. Faverjon, G. Tarriere, C. Got, C. Patel, A.	year volume number pages month or issue	1984
title	Ten years of safety due to the three-point seat belt		
source	Advances in Belt Restraint Systems: design, performance, and usage; Society of Automotive Engineers Int. Congress		
publication place	Warrendale, Pennsylvania		

indicator desc.	severe injury rates by part of body for belted vs. unbelted, also ejection rate French data (Renault). effectiveness of French SBUL
what was counted	injuries
how it was reported	% distribution, number, rates
how it was used	SBUL evaluation
source records	corporate records
body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, lower extremities, pelvis
severity coding	AIS
miscellaneous related variables	crash configuration, ejection
sbul link?	yes
results desc.	injury severity and distribution by part of body for belted vs. unbelted ejection (-), severe head (-), chest (-), abdomen (-), pelvis (-), legs (-)

source institution French data, (Renault)

document number	103	accession number	S-85-0867
reviewer	Landes	abstract only?	no

author	Henry, C. Faverjon, G. Thomas, C. Tarriere, C. Got, C. Patel, A.	year	1981
		volume	
		number	
		pages	
		month or issue	
title	Comparison of risks for restrained drivers and their front passenger in frontal collisions		
source	Proceedings of the 6th International IRCOBI Conference		
publication place			

indicator desc.	driver, front passenger risk in frontal collisions, restrained drivers and front passengers are compared in frontal collisions		
what was counted	injuries		
how it was reported	number		
how it was used	other evaluation		
source records	corporate records		
body part(s) studied	head, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities, pelvis		
severity coding	AIS		
miscellaneous related variables	seating position		
sbul link?	no		
results desc.	<p>a comparison is made between severe injuries of drivers and front seat passengers (both restrained)</p> <p>no difference in proportion of injuries. most wounded body areas are identified (same for both front seat occupants).</p> <p>severity of injury (AIS) by body part differences are noted.</p>		

source institution	Peugeot-Renault Association
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document number	67	accession number	Gurin
reviewer	Race	abstract only?	no

author	Highway Loss Data Institute	year	1986
		volume	
		number	
		pages	
		month or issue	

title	Insurance Special Report: a preliminary evaluation of New York and New Jersey insurance claim results before and after enactment of mandatory seat belt legislation, ...		
source	Highway Loss Data Institute		
publication place			

indicator desc.	New York, New Jersey		
	insurance data		

what was counted	insurance claims, costs		
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how it was reported	number		
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how it was used	SBUL evaluation		
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source records	insurance records		
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body part(s) studied			
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severity coding			
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miscellaneous related variables			
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sbul link?	yes		
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results desc.	both states had lower overall injury claim frequency results after law was passed as compared to before		
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source institution	Highway Loss Data Institute Watergate Six Hundred Washington, DC 20037		
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document number	68	accession number	Gurin
reviewer	Race	abstract only?	no

author	Highway Loss Data Institute	year	1988
		volume	
		number	
		pages	
		month or issue	
title	Insurance Special Report: insurance injury loss experience in eight states with seat belt laws, 1983-1986 models		
source	Highway Loss Data Institute		
publication place			

indicator desc.	collision/injury claim frequencies and percentages
	insurance data
what was counted	insurance claims, costs
how it was reported	number
how it was used	SBUL evaluation
source records	insurance records
body part(s) studied	
severity coding	
miscellaneous related variables	
sbul link?	yes
results desc.	pre-post law comparisons: found no reductions in personal injury protection coverage claims in 1983-1986 model years. Relatively minor injuries. Post law injury claim frequencies and in some cases percent of collision coverage claims also having an injury claim was generally lower.

source institution	Highway Loss Data Institute Watergate Six Hundred Washington, DC 20037
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document number	92	accession number	S-87-1523
reviewer	Benjamin	abstract only?	no

author	Hoffman, M.A.	year	1987
	Spence, L.J.	volume	27
	Wesson, D.E.	number	9
	Armstrong, P.F.	pages	974-976
	Williams, J.I.	month or issue	September
	Filler, R.M.		
title	The pediatric passenger: trends in seatbelt use and injury patterns		
source	Journal of Trauma		
publication place			

indicator desc.	severe head (-), solid viscera (-), lumbar spine (+), intestine injury (+), high cervical chord (+), lower extremity fractures (+)
	number of cases by body part injured
what was counted	hospital admissions, hospital stays
how it was reported	number
how it was used	case reports
source records	accident records, hospital records
body part(s) studied	external, head, face, thorax, abdomen/pelvic contents
severity coding	AIS, ISS
miscellaneous related variables	belt use
sbul link?	no
results desc.	tabulate number of cases vs. restraint or no restraint groups approximately equal
	pediatric study

source institution	David E. Wesson The Hospital for Sick Children 555 University Avenue Toronto, Ontario, Canada M5G 1X8
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document number	12	accession number	C-82-0775
reviewer	Miller	abstract only?	no

author	Huelke, D.F.	year	1981
		volume	
		number	
		pages	
		month or issue	

title	Effectiveness of occupant restraints in reducing serious injuries and fatalities
source	Proceedings of the International Symposium on Occupant Restraints, Toronto, June 1981
publication place	Morton Grove, Illinois; A.A.A.M.

indicator desc.	head, neck, chest, abdominal injuries (fatal and serious)
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what was counted	injuries
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how it was reported	rates
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how it was used	safety belt effectiveness eval.
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source records	accident records
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body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, lower extremities
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severity coding	AIS, OAIS
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miscellaneous related variables	crash configuration, belt use, ejection
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sbul link?	no
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results desc.	% reduction in number of cases by body part for fatalities and serious injuries for those wearing belts vs. unrestrained
	overall serious injuries (-), head (-), neck (-), chest (-), abdomen (-), legs (-)

source institution	NHTSA NCSS
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document number	93	accession number	S-83-0576
reviewer	Benjamin	abstract only?	no

author	Huelke, D.F. Compton, C.P	year	1983
		volume	41
		number	
		pages	241-244
		month or issue	

title	Facial injuries in automobile crashes
source	Journal of Oral and Maxillofacial Surgery
publication place	

indicator desc.	AIS all levels: Facial injuries (-) AIS > or = 3: head (-), neck (-), face (-), chest (-), back (-), abdomen (-), extremities (-) All cases from towaway crashes, reported injuries to National Crash Severity Study. % body part injury to all occupants, not just front seat
what was counted	injuries
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	accident records, NCSS
body part(s) studied	face
severity coding	AIS, OAIS
miscellaneous related variables	vehicle parts, belt use
sbul link?	no
results desc.	tabulates % body part > or = 3 AIS, belted vs. nonbelted.

source institution	Huelke, HSRI U. of Michigan
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document number	112	accession number	C-78-2690
reviewer	Benjamin	abstract only?	no

author	Huelke, D.F. Lawson, T.E.	year	1978
		volume	9
		number	1
		pages	11-15
		month or issue	July-Aug.

title	Injuries to rear-seat passengers in frontal automotive crashes
source	HSRI Research Review
publication place	

indicator desc.	injury vs. no injury % of accident occupants with no injury
what was counted	persons involved
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	accident records, HSRI data file (CPIR)
body part(s) studied	
severity coding	AIS
miscellaneous related variables	crash configuration, belt use, seating position, speed, age of occupant, car size
sbul link?	no
results desc.	tabulates belted vs. nonbelted

source institution HSRI Collision Performance and Injury Report File

document number	86	accession number	NSC
reviewer	Benjamin	abstract only?	no

author	Huelke, D.F. Lawson, T.E. Scott, R. Marsh, J.C.	year volume number pages month or issue	1977
title	The effectiveness of belt systems in frontal and rollover crashes		
source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine		
publication place			

indicator desc.	head (-), neck severe (-), neck minor (+), thorax (-), torso severe (-), lower extremity severe (-), ejection AIS 3-5 severity for drivers only		
what was counted	injuries		
how it was reported			
how it was used	safety belt effectiveness eval.		
source records	accident records, CPIR, RSCS		
body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis		
severity coding	AIS, OAIS		
miscellaneous related variables	crash configuration, belt use, seating position		
sbul link?	no		
results desc.			

source institution	U. of Michigan HSRI, used Collision Performance Injury Report (CPIR), and the Calspan Restraint System Effectiveness Study (RSES)
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document number	114	accession number	S-82-0188
reviewer	Fearn	abstract only?	no

author	Huelke, D.F. O'Day, J.O. Barhydt, W.H.	year	1982
		volume	22
		number	1
		pages	50-52
		month or issue	

title	Ocular injuries in automobile crashes
source	Journal of Trauma
publication place	

indicator desc.	eye injuries (incidence/nature) partial/permanent loss of visual acuity ocular injuries in car crashes number of moderate to sever injuries to the eye
what was counted	injuries
how it was reported	number
how it was used	
source records	accident records
body part(s) studied	face, eye
severity coding	AIS
miscellaneous related variables	vehicle parts
sbul link?	no
results desc.	indicates the need for widespread use of high penetration resistant windshields cites a review article which indicated that use of lap/shoulder belts will decrease the frequency of eyeball injuries

source institution	NHTSA NCSS
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document number	94	accession number	C-87-1759
reviewer	Benjamin	abstract only?	no

author	Huelke, D.F. Sherman, H.W. Elliott, A.F.	year	??
		volume	
		number	
		pages	
		month or issue	

title	The rear seat occupant from data analysis of selected clinical case studies
source	??
publication place	

indicator desc.	AIS 3-6. Body part: head (face) (-), neck (-), chest (+), abdomen (+), extremities (-), back (-) Rear seat occupants, AIS by 6 categories, body part, number of cases
what was counted	persons injured
how it was reported	% distribution
how it was used	epidemiological studies
source records	accident records, FARS, NCSS, NASS, CPIR
body part(s) studied	
severity coding	MAIS
miscellaneous related variables	crash configuration, seating position, age of occupant
sbul link?	no
results desc.	tabulation of category vs. seat belt use

source institution	NCSS, NASS, FARS, Michigan '83 Accident files, CPIR/UMIVOR, University of Michigan Hospital
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document number
reviewer

72
Race

accession number
abstract only?

S-75-0355
no

author

Huelke, D.F.
Sherman, H.W.
O'Day, J.O.

year
volume
number
pages
month or issue

title

The hazard of the unrestrained occupant

source

Proceedings of the 18th Conference of the American Association for Automotive Medicine

publication place

indicator desc.

injuries due to collision with other passengers including unrestrained hitting restrained

occupant-to-occupant injuries

what was counted

injuries

how it was
reported

number

how it was used

case reports

source records

accident records

body part(s)
studied

head, face, neck/throat, neck, thorax, chest, abdomen/pelvic contents, extremities/pelvis, upper extremities

severity coding

AIS

miscellaneous
related variables

occupant-to-occupant contact, vehicle parts

sbul link?

no

results desc.

analysis from performance and injury reports.
UM 40,000 collisions
(Long form Revision 3)
General Motors
occurs in 22 % of cars with more than 1 occupant
upper body injuries

source institution

Highway Safety Research Institute (now UMTRI)
University of Michigan

document number	8	accession number	C-82-0858
reviewer	Miller	abstract only?	no

author	Huelke, D. O'Day, J. Mendelsohn, R.	year	1981
		volume	54
		number	
		pages	316-322
		month or issue	March

title	Cervical injuries suffered in automobile crashes
source	Journal of Neurosurgery
publication place	

indicator desc.	cervical spine injuries
	limited to cars towed from scene

what was counted	injuries
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how it was reported	number
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how it was used	safety belt effectiveness eval., epidemiological studies
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source records	accident records
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body part(s) studied	neck/throat, neck, spine, cervical
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severity coding	AIS
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miscellaneous related variables	crash configuration, vehicle parts, ejection
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sbul link?	no
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results desc.	very little relates to seat belts (see p. 319)
	cites other sources for positive effect of seat belts in reducing severe or fatal neck injuries
	Of 130 occupants with severe or fatal neck injury, only 4 had belts.

source institution	NHTSA NCSS
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document number	1	accession number		Gurin
reviewer	Miller	abstract only?		no

author	Hunter, W.W. Reinfurt, D.W. Hirsch, M.G.	year	1988
		volume	
		number	
		pages	
		month or issue	

title	Analysis of Occupant Restraint Issues from State Accident Data
source	University of North Carolina Highway Safety Research Center
publication place	Chapel Hill, North Carolina

indicator desc.	number of injuries total, by injury type, part of body, ejections, various types of accidents tied to SBUL in New Jersey
what was counted	injuries
how it was reported	rates
how it was used	safety belt effectiveness eval., SBUL evaluation
source records	accident records
body part(s) studied	head, face, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities
severity coding	KABC
miscellaneous related variables	crash configuration, ejection, belt use, accident type, injury type
sbul link?	yes
results desc.	two types of analysis: 1) changes in injuries across time looking at period of seat belt use law in N.J. 2) comparison of restrained and unrestrained occupants in N.J. and Pennsylvania. Generally positive results. % (rate) of occupants injured with belts less than occupants without belts

source institution	New Jersey and Pennsylvania state accident records analyzed by UNC HSRC. received by UNC HSRC from NHTSA
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document number	25	accession number	C-85-3091
reviewer	Miller	abstract only?	no

author	Insurance Institute for Highway Safety	year	1985
		volume	20
		number	11
		pages	
		month or issue	October 5

title	British study links seat belt use to drop in injuries
source	IIHS Status Report
publication place	

indicator desc.	number of MV injuries, by part of body, hospital days, avg. injury severity scores
	data on 14,000 crash patients from 15 hospitals in England, Scotland, and Wales
	summary of original report. 14,000 crash patients from 15 hospitals in the U.K.
what was counted	hospital bed-days, hospital admissions, hospital stays, ER visits, injuries
how it was reported	% distribution, number
how it was used	SBUL evaluation
source records	hospital records
body part(s) studied	head, brain, face, neck/throat, neck, spine, thorax, heart/lung
severity coding	ISS
miscellaneous related variables	seating position, belt use
sbul link?	yes
results desc.	comparison of belted and unbelted drivers before and after law in U.K. ER-treated injuries (-), admissions (-), severe (-), multiple severe (-), multiple minor (-), major brain (+), facial fractures (+/-), minor scalp (+), spine (+), hospital days (-), minor face (-), lung (-)

source institution	see original study: Rutherford, Greenfield, et al.
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document number	76	accession number		DIALOG
reviewer	Benjamin	abstract only?		yes

author	Janssen, E.G.	year	1985
		volume	33
		number	4
		pages	73-76
		month or issue	April

title	Safety belts--the influence of the safety belt on the injuries of vehicle occupants in different kinds of collisions		
source	Verkeersrecht		
publication place			

indicator desc.	injury severity related to type of collision		
	EMS reports ejections		

what was counted	injuries		
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how it was reported			
how it was used	safety belt effectiveness eval.		

source records			
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body part(s) studied			
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severity coding			
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miscellaneous related variables	crash configuration, speed, ejection		
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sbul link?	no		
results desc.			

source institution			
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document number	60	accession number	Gurin
reviewer	Race	abstract only?	no

author	Johnson, S.	year	
		volume	
		number	
		pages	
		month or issue	

title	Data base linkage and the sensitivity index
source	Maine Health Information Center
publication place	Augusta, Maine

indicator desc.	patient records based on at scene reports (accident, ambulance), enroute (ambulance), at the hospital (discharge data), and/or vital statistics (death certificate)
	EMS reports
what was counted	persons injured
how it was reported	rates
how it was used	other evaluation, EMS system
source records	accident records, death certificates, hospital records, inpatient records
body part(s) studied	
severity coding	Champion's trauma score
miscellaneous related variables	
sbul link?	no
results desc.	data base includes restraint use information for traffic injuries. inconsistent use of E-codes by hospitals

source institution	Sandra W. Johnson, Director EMS Data Research Unit Maine Health Information Center 81 Winthrop Street Augusta, Maine 04330 (207) 623-2555
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document number	35	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Johnston, P.B. Armstrong, M.F.	year	1986
		volume	70
		number	6
		pages	460-462
		month or issue	June

title	Eye injuries in Northern Ireland two years after seat belt legislation
source	British Journal of Ophthalmology
publication place	

indicator desc.	penetrating eye injuries (-)
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what was counted	persons injured
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how it was reported	number
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how it was used	safety belt effectiveness eval.
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source records	hospital records
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body part(s) studied	face, eye
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severity coding	
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miscellaneous related variables	seating position
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sbul link?	yes
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results desc.	246 cases reviewed, 1984-1985. Motor-vehicle accidents caused 63 in front seaters. 60% reduction in incidence after law.
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source institution	Royal Victoria Hospital, Belfast, Northern Ireland
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document number	49	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Johnstone, B.R. Waxman, B.P.	year	1987
		volume	57
		number	7
		pages	455-460
		month or issue	July

title	Transverse disruption of the abdominal wall--a tell-tale sign of seat belt related hollow viscus injury		
source	Australia and New Zealand Journal of Surgery		
publication place			

indicator desc.	thorax/abdomen, bruised/fractured ribs and sternum hollow viscus, abdominal wall disruption, right rib fracture, left clavicle fracture, right breast and spine complex of injuries in front seat passengers with harness and high speed		
what was counted	injuries		
how it was reported	number		
how it was used	case reports		
source records	hospital records, inpatient records		
body part(s) studied	spine, thorax, heart/lung, ribs, abdomen/pelvic contents		
severity coding			
miscellaneous related variables	crash configuration, belt use, seating position, speed		
sbul link?	no		
results desc.	5 case reports		

source institution	University of Melbourne Department of Surgery
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document number	5	accession number		Gurin
reviewer	Miller	abstract only?		yes

author	Junghans, K.	year	1978
		volume	
		number	
		pages	
		month or issue	

title	Seatbelt-related abdominal injuries
source	Langenbecks Arch. Chir.
publication place	

indicator desc.	abdominal injuries
	German article

what was counted	injuries
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how it was reported	
how it was used	
source records	

body part(s) studied	abdomen/pelvic contents
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severity coding	
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miscellaneous related variables	belt-induced injury, belt use
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sbul link?	no
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results desc.	use of seat belts seems to decrease head injuries and increase abdominal injuries
	head (-), abdominal lesions (+),
	abdominal wall injuries, liver ruptures

source institution	German data base
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document number	118	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Kahnberg, K.E. Gothberg, K.A.	year	1987
		volume	16
		number	2
		pages	154-
		month or issue	April

title	Le Fort fractures (I). A study of frequency, etiology and treatment
source	International Journal of Oral and Maxillofacial Surgery
publication place	

indicator desc.	severity of maxillofacial fractures. classified as Le Fort I, II, III and partial maxillary
what was counted	injuries
how it was reported	number
how it was used	SBUL evaluation
source records	hospital records
body part(s) studied	face, mouth
severity coding	Le Fort number
miscellaneous related variables	
sbul link?	yes
results desc.	301 cases reviewed and tabulated 1969-1982. Law in 1975. Distribution of fractures has changed to less severe.

source institution	
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document number
reviewer

6
Miller

accession number
abstract only?

Gurin
yes

author

Karlson, Trudy

year 1982
volume 22
number 4
pages
month or issue

title

The incidence of hospital-treated facial injuries from vehicles

source

Journal of Trauma

publication place

indicator desc.

facial injuries
fractures, soft-tissue injuries, dental injuries

what was counted

ER visits, injuries

how it was
reported

how it was used

epidemiological studies

source records

hospital records, ER records

body part(s)
studied

face

severity coding

AIS

miscellaneous
related variables

vehicle parts, injury type

sbul link?

no

results desc.

unclear from abstract how much relates to seat belts

source institution All Dane County, Wisconsin hospitals

Trudy Karlson
Center for Health Systems Research and Analysis
University of Wisconsin--Madison
1225 Observatory Drive
Madison, Wisconsin 53706

document number	48	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Keeling, P. Calthorpe, D. Lane, B. Collins, P.G.	year	1987
		volume	18
		number	2
		pages	93-95
		month or issue	

title	Blunt injury of the neck of the pancreas: a report of nine patients
source	Injury
publication place	

indicator desc.	blunt injury to pancreas surgical diagnosis thorax/abdominal injuries
what was counted	persons injured
how it was reported	number
how it was used	case reports
source records	hospital records, inpatient records
body part(s) studied	abdomen/pelvic contents
severity coding	
miscellaneous related variables	belt use
sbul link?	no
results desc.	case reports. 8 of 9 in auto crash, 2 of 8 used seat belts probably not significant, 25 % seat belt use

source institution	
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document number	37	accession number	S-??????
reviewer	Benjamin	abstract only?	no

author	Larder, D.R. Twiss, M.K. Mackay, G.M.	year	1985
		volume	
		number	
		pages	
		month or issue	

title	Neck injury to car occupants using seat belts
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source	29th Annual Proceedings of the American Association for Automotive Medicine, Washington, DC, October, 1985
publication place	

indicator desc.	neck injuries, soft tissue or sprain (+) AIS 0 in one group, higher in other group prolonged symptoms defined as > 1 month
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what was counted	injuries
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how it was reported	number, scores
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how it was used	case reports
-----------------	--------------

source records	accident records
----------------	------------------

body part(s) studied	neck, neck/throat
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severity coding	AIS
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miscellaneous related variables	belt use, vehicle parts, head restraint
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sbul link?	no
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results desc.	sample of reported cases, 282 neck injuries hospital records, questionnaire many cases not in data base because of minor nature, but symptoms persist restraints do not limit low AIS neck injuries in-depth investigation
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source institution	Birmingham University Accident Research Unit
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document number	116	accession number	Gurin
reviewer	Fearn	abstract only?	no

author	League General Insurance Company	year	1986
		volume	
		number	
		pages	
		month or issue	

title	Claims for severe injuries reduced 39 percent in first six months of Michigan safety-belt law, study by League General Insurance Co. shows
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source	CUNA Mutual Insurance Group League General Insurance Company
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publication place	
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indicator desc.	number of insurance claims for severe injury
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what was counted	insurance claims
------------------	------------------

how it was reported	rates, number
---------------------	---------------

how it was used	SBUL evaluation
-----------------	-----------------

source records	insurance records
----------------	-------------------

body part(s) studied	
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severity coding	
-----------------	--

miscellaneous related variables	
---------------------------------	--

sbul link?	yes
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results desc.	to assess impact of SBUL (desirable direction) severe injury claims (-)
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source institution	League General Insurance Company G.P.O. Box 430-A Detroit, Michigan 48232 1-800-431-7464
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document number	40	accession number	??
reviewer	Benjamin	abstract only?	??

author	Lesoin et al.	year	1985
		volume	
		number	
		pages	
		month or issue	

title	Has the seat belt replaced the hangman's noose
source	Lancet
publication place	

indicator desc.	increase fractures of C2
	spine injuries
	28 of 35 cases wearing seat belts, no head rests

what was counted

how it was reported

how it was used

source records

body part(s) studied

severity coding

miscellaneous related variables

sbul link?

results desc.	35 case reports 1970-1984
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source institution

document number	96	accession number	C-78-1202
reviewer	Benjamin	abstract only?	no

author	Mackay, G.M. Gloyns, R.F. Hayes, H.R.M. Griffiths, D.K. Rattenbury, S.J.	year	1975
		volume	
		number	
		pages	
		month or issue	

title	Serious trauma to car occupants wearing seat belts
source	Proceedings of the 2nd International Conference on the Biomechanics of Serious Trauma
publication place	

indicator desc.	head, neck, chest, arms, abdomen, spine, pelvis, legs front seat occupants, 3 point belts, AIS, body part injured no comparison with nonbelted
what was counted	injuries
how it was reported	number
how it was used	safety belt effectiveness eval.
source records	hospital records
body part(s) studied	head, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities, pelvis
severity coding	AIS
miscellaneous related variables	crash configuration, belt use
sbul link?	no
results desc.	tabulates number of cases by AIS & body part no tabulation of non-seat belt biased study by selection

source institution	Accident Research Unit Birmingham, UK
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document number	65	accession number	C-85-2302
reviewer	Benjamin	abstract only?	no

author	Mackay, M.	year	1985
		volume	
		number	
		pages	
		month or issue	

title Two years' experience with the seat belt law in Britain

source Society of Automotive Engineers Technical Paper Series 851234

publication place Warrendale, Pennsylvania

indicator desc. reduction in hospital admissions, injury patterns
health care
front seat occupants
concussion(-), fractured skull(-), facial wounds (-),
eye(-), rib fractures (+), internal chest (-),
neck sprains (+), cervical fractures (-), lumbar sprains and fractures (+), abdominal
injury (-)
what was counted hospital admissions, hospital stays

how it was reported % distribution, number

how it was used SBUL evaluation

source records accident records, hospital records

body part(s) studied head, face, eye, neck/throat, neck, spine, cervical, lumbar, thorax, sternum, ribs,
abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities,
pelvis

severity coding

miscellaneous related variables injury type, belt use

sbul link? yes

results desc. tabulates cases before and after law. General driving activity slightly up. Other
accident, pedestrian & cyclists also show reductions. Drop is significant based on
miles per driver..
Concussion (-), skull fracture (-), facial wounds (-),
eye (-), rib fractures (+), internal chest (-), neck sprains (+), Cx fractures (-),
lumbar sprains and
fractures (+), abdominal injuries (-).

source institution Department of Transport, United Kingdom

document number	101	accession number	C-87-2291
reviewer	Hoskin	abstract only?	no

author	Marburger, E.A. Friedel, B.	year	1987
		volume	27
		number	7
		pages	703-705
		month or issue	July

title	Seat belt legislation and seat belt effectiveness in the Federal Republic of Germany		
source	Journal of Trauma		
publication place			

indicator desc.	nature of injury, part of body, hospital records of patients admitted for MV injuries		
what was counted	injuries		
how it was reported	number		
how it was used	safety belt effectiveness eval.		
source records	hospital records, inpatient records		
body part(s) studied	head, face, eye, mouth, spine, cervical, thorax, heart/lung, Abdomen/pelvic, Extremities/pelvis, lower extremities		
severity coding			
miscellaneous related variables	belt use		
sbul link?	yes		
results desc.	injuries reduced: head, knee fractures, soft-tissue injuries to lower extremities, cervical fractures, major liver and lung injuries, intra-abdominal angiorrhesis, eye and jaw injuries. Specific injuries increased: cervical distortions, minor soft-tissue injuries to pelvis and thorax		

source institution	
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document number 27
reviewer Miller

accession number S-82-0141
abstract only? no

author Mellbring, G
Dahlin, S.
Lindblad, B.

year
volume 12
number 6
pages 506-509
month or issue

title The hospital experience of seat belt legislation in the county of Skaraborg, Sweden

source Injury

publication place

indicator desc. hospital admissions, injuries by AIS, by part of body, related to seat belt use
comparison of belted vs. unbelted occupants
part of body: head, neck, thorax, abdomen, pelvis, arm, leg

what was counted hospital admissions, hospital stays, ER visits, injuries

how it was reported % distribution, number

how it was used SBUL evaluation

source records accident records, hospital records, ER records

body part(s) studied head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities, pelvis

severity coding AIS

miscellaneous related variables seating position, belt use

sbul link? yes

results desc. hospital admissions (-), number of injuries/front seat (-), head (-), neck (-), thorax (+, although less severe)

source institution County Hospitals in Sweden

document number	4	accession number	S-85-0973
reviewer	Miller	abstract only?	no

author	Mills, P.J. Hobbs, C.A.	year	1984
		volume	
		number	
		pages	223-235
		month or issue	November

title	The Probability of Injury to car occupants in frontal and side impacts		
source	SAE Technical Paper Series		
publication place			

indicator desc.	number of injuries by part of body head, chest, lower limb and pelvic injuries in frontal and side impacts towaway police data % reduction in probabilities with belts use vs. unrestrained		
what was counted	injuries		
how it was reported	% distribution, number		
how it was used	safety belt effectiveness eval.		
source records	hospital records, accident records		
body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, lower extremities, pelvis		
severity coding	AIS, MAIS		
miscellaneous related variables	crash configuration, belt use, seating position, speed		
sbul link?	no		
results desc.	see p. 234. front seat/front impact-- belts reduced injuries side impacts (seated on side of impact)-- significant reduction with belts English data, uses Probit analysis		

source institution	police data (from England ?)
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document number	104	accession number	??
reviewer	Race	abstract only?	yes

author	Moreland, J.D.	year	1962
		volume	5
		number	
		pages	95-111
		month or issue	

title	Safety belts in motor cars: an assessment of their effectiveness
source	Annals of Occupational Hygiene
publication place	

indicator desc.	damage index, car-weight ratio
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what was counted	injuries
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how it was reported	
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how it was used	safety belt effectiveness eval.
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source records	
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body part(s) studied	
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severity coding	
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miscellaneous related variables	belt use, damage index
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sbul link?	no
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results desc.	Given cars with the same damage index car/weight ratio, risk of injury was higher for 1) those ejected, 2) passengers vs. drivers, 3) those not wearing seat belts
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source institution	
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document number	19	accession number	Gurin
reviewer	Miller	abstract only?	no

author	Mueller, E.	year	
		volume	
		number	
		pages	
		month or issue	

title	Trauma from auto accidents...
source	unpublished draft
publication place	

indicator desc.	number of injuries by severity score cost of medical treatment, admission to hospital
-----------------	--

what was counted	hospital admissions, hospital stays, injuries, costs
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how it was reported	scores
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how it was used	safety belt effectiveness eval.
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source records	hospital records, ER records, inpatient records
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body part(s) studied	
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severity coding	ISS
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miscellaneous related variables	seating position, belt use
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sbul link?	
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results desc.	1,364 patients reviewed in 4 hospitals over 6 months 58 % wearing safety belt, 42% not 1.8 ISS for belt wearers, 4.51 for non-belt wearers belts are self-reported ?? belt use correlated to ability to pay for injuries sustained.
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source institution	U. of Illinois Affiliated Hospitals (Lutheran General, Illinois Masonic, Mercy, Cook County) Elizabeth Mueller, M.D. Lutheran General Hospital Park Ridge, Illinois
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document number	47	accession number	S-87-1205
reviewer	Benjamin	abstract only?	no

author	Muwanga, C.L. Cole, R.P. Sloan, J.P. Bruce, E. Dove, A.F. Dave, S. H.	year	1986
		volume	17
		number	1
		pages	37-39
		month or issue	January

title Cardian contusion in patients wearing seat belts

source Injury

publication place

indicator desc. 14 cases with chest injury, EKG changes, rise in CK-MB isoenzyme level

 thorax/abdominal injuries

 myocardial contusion(+), measured by enzyme CK + CK-MB

what was counted hospital admissions, hospital stays

how it was reported % distribution, number

how it was used safety belt effectiveness eval., case reports

source records hospital records, inpatient records

body part(s) studied heart/lung, thorax

severity coding

miscellaneous related variables seating position, belt use

sbul link? no

results desc. From 8 hours to 72 hours, look for rise of 4 % in indicator. Controls were both seat belt and non seatbelt. All cases had thoracic injuries, ribs or sternum fractures

 Not useful--all cases already have thoracic injuries.

source institution

document number	17	accession number	S-84-0258
reviewer	Miller	abstract only?	no

author	Newman, R.J. Jones, I.S.	year	1984
		volume	24
		number	2
		pages	129-135
		month or issue	

title	A prospective study of 413 consecutive car occupants with chest injuries		
source	Journal of Trauma		
publication place			

indicator desc.	chest injuries		
	English hospital study		
	used collision damage classification		
what was counted	injuries		
how it was reported	% distribution		
how it was used	safety belt effectiveness eval.		
source records	hospital records		
body part(s) studied	head, face, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities		
severity coding	AIS, MAIS, ISS		
miscellaneous related variables	crash configuration, seating position, vehicle parts, belt use, speed		
sbul link?	no		
results desc.	severity and type of chest injury compared for restrained vs unrestrained.		
	percentage of some chest injuries increased for belt-wearers		
	belt use decreased severity of injury		

source institution	John Radcliffe Hospital Oxford, England
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document number	84	accession number	NSC
reviewer	Benjamin	abstract only?	no

author	Nordentoft, E.L. Nielsen, H.V. Eriksen, E. Weeth, R.	year volume number pages month or issue	1977
title	Effect of mandatory seat belt legislation in Denmark, with special regard to minor and moderate injury		
source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine		
publication place			

indicator desc.	body parts: head (-), trunk (+), neck (+) per cent of total injury ascribed to body part denominator of rates: average daily traffic
what was counted	ER visits, injuries
how it was reported	% distribution, rates (denominator: average daily traffic)
how it was used	SBUL evaluation, epidemiological studies
source records	accident records, hospital records
body part(s) studied	head, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities
severity coding	disability days
miscellaneous related variables	seating position, belt use, disability days
sbul link?	yes
results desc.	tabulates seat belt use vs. non belt use

source institution	Odense University Hospital, Denmark
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document number	21	accession number	C-84-1311
reviewer	Miller	abstract only?	no

author	Norin, H. Carlsson, G. Korner, J.	year	1984
		volume	
		number	
		pages	
		month or issue	

title	Seat belt usage in Sweden and its injury reducing effect
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source	Advances in Belt Restraint Systems: design, performance, and usage; Society of Automotive Engineers Int. Congress
publication place	Warrendale, Pennsylvania

indicator desc.	head injury rate and chest injury rate comparison of rates before and after Swedish SBUL
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what was counted	injuries
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how it was reported	rates
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how it was used	safety belt effectiveness eval., SBUL evaluation
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source records	corporate records
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body part(s) studied	head, thorax
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severity coding	AIS
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miscellaneous related variables	seating position, belt use
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sbul link?	yes
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results desc.	minor and moderate injuries (-), severe injuries (-), overall injury rate (-) minor to moderate chest (+), severe chest (-), minor to moderate head (-), severe head (-)
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source institution	Volvo, Sweden
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accession number ILL
abstract only? no

author Nygren, A.

year '82?
volume
number
pages
month or issue

title	Injuries to car occupants--some aspects of the interior safety of cars: a study of a 5-year material from an insurance company
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source Acta Otolaryngologica

publication place

indicator desc.

what was counted injuries

how it was reported	% distribution, number
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how it was used safety belt effectiveness eval., epidemiological studies

source records insurance records, hospital records, accident records

body part(s) studied	head, face, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis
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severity coding ISS, AIS

miscellaneous crash configuration, seating position, accident type, belt use, injury type
related variables

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sbul link?          no

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results desc. severe injuries occurred twice as often among unbelted front-seat passengers as belted ones. 3 times more often for unbelted drivers than belted.

positive effect of seat belts in diminishing severity of injury. approximately 30 % decrease in number of injuries. facial injuries relatively high among belted drivers

source institution Kaloniska Hospital, Sweden
Folksam Insurance Group, Sweden

document number	3	accession number	C-84-1997
reviewer	Miller	abstract only?	no

author	O'Day, J. Scott, R.E.	year	1984
		volume	14
		number	5
		pages	1-5
		month or issue	

title	Myths and Realities of Seat Belt Use
source	UMTRI Research Review
publication place	

indicator desc.	consciousness after crash, ejection
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what was counted	injuries, number of conscious occupants, number of ejections
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how it was reported	% distribution, number, rates
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how it was used	safety belt effectiveness eval.
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source records	accident records
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body part(s) studied	
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severity coding	
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miscellaneous related variables	ejection, belt use
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sbul link?	no
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results desc.	positive effect of belts on consciousness after crash and preventing ejection
	consciousness after crash (+), ejection (-)

source institution	NCSS, NASS
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document number	75	accession number	C-85-2298
reviewer	Benjamin	abstract only?	no

author	O'Day, J. Scott, R.E.	year	1984
		volume	11
		number	2
		pages	141-146
		month or issue	Summer

title	Safety belt use, ejection and entrapment
source	Health Education Quarterly
publication place	

indicator desc.	relates to fatalities EMS reports ejections
what was counted	injury episodes, ER visits
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	accident records, special studies
body part(s) studied	
severity coding	
miscellaneous related variables	ejection
sbul link?	no
results desc.	statistics on ejections, fire, submersion, with and without seat belts

source institution	NASS, UMTRI, NCSS
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document number	36	accession number	S-87-1110
reviewer	Benjamin	abstract only?	no

author	Olney, D.B. Marsden, A.K.	year	1986
		volume	17
		number	6
		pages	365-367
		month or issue	

title	The effect of head restraints and seat belts on the incidence of neck injury in car accidents
source	Injury
publication place	

indicator desc.	neck injuries head restraint evaluation
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what was counted	ER visits, Injuries
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how it was reported	number
how it was used	other evaluation

source records	hospital records, ER records
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body part(s) studied	neck, neck/throat
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severity coding	
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miscellaneous related variables	belt use, vehicle parts
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sbul link?	no
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results desc.	Tabulations of indicator by restraints & seat belts, or none. 126 patients. No effect
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source institution	Accident and Emergency Department, Pinderfields General Hospital, Wakefield, England
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document number	109	accession number	NSC
reviewer	Benjamin	abstract only?	no

author	Orsay, E.M. Turnbull, T.L. Dunne, M. Barrett, J.A. Langenberg, P. Orsay, C.P.	year volume number pages month or issue	1988 260 24 3598-3603 Dec.23/30
title	Prospective study of the effect of safety belts on morbidity and health care costs in motor-vehicle accidents		
source	Journal of the American Medical Association		
publication place			

indicator desc.	severity of injury, health care costs ISS based on AIS overall score ISS=sum of top three AIS, squared hospital charges
what was counted	hospital stays, hospital admissions, ER visits, costs
how it was reported	% distribution, averages
how it was used	safety belt effectiveness eval.
source records	hospital records, ER records, inpatient records
body part(s) studied	
severity coding	ISS
miscellaneous related variables	crash configuration, belt use, seating position, speed, alcohol use
sbul link?	no
results desc.	compares mean severity scores and costs for users vs. nonusers. Subsets by type of impact, position of victim.

source institution	Patricia Langenberg School of Public Health University of Illinois
	4 Chicago hospitals study of cases presented to ER after motor-vehicle accidents

document number	31	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Patel, B.C.K. Morgan, L.H.	year	1988
		volume	5
		number	1
		pages	21-25
		month or issue	

title	Penetrating eye injuries in road traffic accidents
source	Archives of Emergency Medicine
publication place	

indicator desc.	penetrating eye injuries eye injuries (incidence/nature) (-) partial/permanent loss of visual acuity (-) visual loss from shattered windshields
what was counted	injuries
how it was reported	% distribution, number
how it was used	epidemiological studies
source records	hospital records, ER records, inpatient records
body part(s) studied	face, eye
severity coding	
miscellaneous related variables	vehicle parts
sbul link?	yes
results desc.	tabulated indicators by restraint use, also before and after law. 8 out of 8 before law, no seat belt. 6 out of 8 after law, no seat belt

source institution	Manchester Eye Hospital, England
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document number	63	accession number	Gurin
reviewer	Race	abstract only?	no

author	Peterson, T.D.	year	1988
		volume	
		number	
		pages	
		month or issue	

title	Comparative summary of injuries and hospital costs in the belted vs. unbelted victims of motor-vehicle accidents
source	
publication place	

indicator desc.	fractures, laceration, head injury, hospital admissions, hospital costs health care
what was counted	hospital admissions, hospital stays, injuries, costs, fractures, lacerations
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	hospital records
body part(s) studied	external, head, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis
severity coding	ISS
miscellaneous related variables	type of vehicle, ejection, belt use, injury type, crash configuration, seating position, speed, alcohol, age
sbul link?	no
results desc.	emergency rooms of 16 hospitals were surveyed, unbelted to belted victims

source institution	Timothy D. Peterson, M.D. Director, Iowa Safety Restraint Assessment Study 1200 Pleasant Street Des Moines, Iowa 50309 (515) 224-6440 (515) 283-5070
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document number	20	accession number	C-84-1313
reviewer	Miller	abstract only?	no

author	Petrucelli, E.	year	1984
		volume	
		number	
		pages	
		month or issue	

title	The USA and safety belt use: a prognosis for the remainder of the '80s
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source	Advances in Belt Restraint Systems: design, performance, and usage; Society of Automotive Engineers Int. Congress
publication place	Warrendale, Pennsylvania

indicator desc.	intensive care unit admissions, plastic surgery clinic referrals, eye trauma clinic cases (cites other studies)
	cites results from other studies

what was counted	medical procedures, clinic visits
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how it was reported	number
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how it was used	safety belt effectiveness eval.
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source records	
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body part(s) studied	
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severity coding	
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miscellaneous related variables	
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sbul link?	no
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results desc.	referred to indicators cited from Canadian and English sources.
	intensive care unit admissions (-), plastic surgery clinic referrals (-), eye trauma clinic cases (-)

source institution	Canadian Ministry of Transportation and Communication
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document number 100
reviewer Landes

accession number S-87-1352
abstract only? no

author Petrucelli, E.

year 1987
volume 27
number 7
pages 706-710
month or issue July

title Seat belt laws: the New York experience--preliminary data and some observations

source Journal of Trauma

publication place

indicator desc. casualty reductions, includes fatalities, but also occupant injuries by severity, occupant head injuries.

Compares 1985 with 1980-1984 average

what was counted injuries, insurance claims

how it was reported number, rates

how it was used SBUL evaluation

source records accident records, insurance records

body part(s) studied head

severity coding

miscellaneous related variables belt use

sbul link? yes

results desc. positive effects of seatbelt law in N.Y.
(as demonstrated by several factors)

source institution

document number	90	accession number	S-79-0531
reviewer	Benjamin	abstract only?	no

author	Petty, P.G.	year	1977
		volume	
		number	
		pages	
		month or issue	

title	The influence of seat belt wearing on the incidence of severe head injury		
source	Proceedings of the 6th International Conference of the International Association for Accident and Traffic Medicine		
publication place			

indicator desc.	head injury mild, severe mild defined as full faculties after one week severe defined as impaired faculties after one week		
what was counted	injuries		
how it was reported	number		
how it was used	SBUL evaluation		
source records	hospital records		
body part(s) studied	head, face		
severity coding			
miscellaneous related variables			
sbul link?	no		
results desc.	incidence of head injuries from year to year. Seat belt use not recorded. Followed seat belt legislation, no records prior to legislation No good controls, essentially anecdotal study, but supports severe head injury as indicator.		

source institution	Prince Henry's Hospital Melbourne, Australia
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document number	15	accession number	C-82-0164
reviewer	Miller	abstract only?	no

author	Plueckhahn, V.D.	year	1980
		volume	20
		number	1
		pages	28-34
		month or issue	

title	Road traffic accidents and the prevention of injury and death of vehicle occupants
source	Medical Science and the Law
publication place	

indicator desc.	injuries per 10,000 vehicles
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what was counted	injuries
------------------	----------

how it was reported	rates
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how it was used	SBUL evaluation
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source records	accident records
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body part(s) studied	
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severity coding	
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miscellaneous related variables	
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sbul link?	yes
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results desc.	rates before and after SBUL in Victoria, Australia
	injuries per 10,000 vehicles (-)

source institution	
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accession number      ILL
abstract only?       no

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author Prentice, H.A.J.

year 1979
volume
number
pages
month or issue

title	Seat belt effectiveness: possible benefits and advertising
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source 1979 International Symposium on Seat Belts in Tokyo

publication place

indicator desc.

what was counted injuries

how it was reported	% distribution, number
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how it was used safety belt effectiveness eval.

source records accident records

body part(s) studied	head, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities, pelvis
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severity coding AIS

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miscellaneous      belt use
related variables
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sbul link?          no

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results desc. positive effect of belts for almost all parts of body

source institution

document number	26	accession number	S-84-0815
reviewer	Miller	abstract only?	no

author	Pye, G. Waters, E.A.	year	1984
		volume	288
		number	
		pages	756-757
		month or issue	March 10

title	Effect of seat belt legislation on injuries in road traffic accidents in Nottingham		
source	British Medical Journal		
publication place			

indicator desc.	number of injuries by AIS before and after legislation part of body: face, head, neck, chest, all		
what was counted	ER visits, injuries		
how it was reported	number		
how it was used	SBUL evaluation		
source records	hospital records, ER records		
body part(s) studied	head, face, neck/throat, neck, thorax		
severity coding	AIS, ISS		
miscellaneous related variables			
sbul link?	yes		
results desc.	number of injuries (-), moderate injuries (-), severe injuries (-), face (-), head (-), neck (-), chest (+/-)		

source institution	large teaching hospital in the U.K.
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document number	2	accession number	Gurin
reviewer	Miller	abstract only?	no

author	Reinfurt, D.W. Campbell, B.J. Stewart, J.R. Stutts, J.C.	year volume number pages month or issue	1988
title	North Carolina's Occupant Restraint Law: A Three-Year Evaluation (excerpts)		
source	University of North Carolina Highway Safety Research Center		
publication place	Chapel Hill, North Carolina		

indicator desc. number of moderate and serious injuries.
A & B injuries, using ABCK scale

what was counted injuries

how it was reported number

how it was used SBUL evaluation

source records accident records

body part(s) studied

severity coding KABC

miscellaneous related variables seating position, belt use

sbul link? yes

results desc. time series for pre-law, warning phase, citation phase
positive effect of law on reducing injuries
serious and fatal injuries (-5.4 % warning phase, -14.6 % citation phase)

source institution UNC HSRC
Reinfurt or Campbell

document number	10	accession number	NSC
reviewer	Miller	abstract only?	NO

author	Rutherford, W.H. Greenfield, T. Hayes, H.R.M. Nelson, J.K.	year volume number pages month or issue
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title The Medical Effects of Seat Belt Legislation in the United Kingdom

source Her Majesty's Stationery Office

publication place London

indicator desc. ER arrivals (-), hospital admissions (-),
bed occupancy (-), severe injuries (-), face (-), eye (-),
brain (-), lung (-), sternum (+), neck sprain (+).
Total number of injuries, injuries by severity, part of body, nature of injury, hospital
admissions, and bed days.
Parts of body: abdomen, pelvis, brain, eye, head/neck, rib, face, spine & back, thorax.
Nature of injury: fractures, dislocations, sprain, abrasion, etc.

what was counted hospital admissions, hospital stays, hospital bed-days, ER visits, injuries

how it was reported % distribution, number

how it was used safety belt effectiveness eval., SBUL evaluation

source records hospital records, ER records, inpatient records

body part(s) studied head, cranium, brain, face, eye, mouth, neck/throat, neck, spine, cervical, thoracic,
lumbar, thorax, heart/lung, sternum, ribs, abdomen/pelvic contents, extremities/pelvis,
upper extremities, lower extremities, pelvis

severity coding AIS, MAIS, ISS

miscellaneous related variables seating position, belt use, injury type

sbul link? yes

results desc. see results on pp. 85-86

source institution 15 hospitals in the U.K.

document number	7	accession number	Gurin
reviewer	Miller	abstract only?	yes

author	Ryan, P. Ragazzon, R.	year	1979
		volume	49
		number	2
		pages	200-
		month or issue	April

title	Abdominal injuries in survivors of road trauma before and since seatbelt legislation in Victoria		
source	Australia and New Zealand Journal of Surgery		
publication place			

indicator desc.	abdominal injuries		
	comparison of 7 years pre- and post-legislation (no change)		
	counted number of hospital admissions mainly		

what was counted	hospital admissions, hospital stays		
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how it was reported	number		
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how it was used	SBUL evaluation		
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source records	inpatient records, hospital records		
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body part(s) studied	abdomen/pelvic contents		
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severity coding	AIS		
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miscellaneous related variables	belt-induced injury		
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sbul link?	yes		
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results desc.	no change in proportion of admission for abdominal injuries, increase for number of admissions for gastrointestinal tract and diaphragm		
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source institution	St. Vincent's Hospital, Melbourne, Australia		
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document number	89	accession number	S-79-0530
reviewer	Benjamin	abstract only?	no

author	Sabey, B.E. Grant, B.E. Hobbs, C.A.	year volume number pages month or issue	1977
title	Alleviation of injuries by use of seat belts		
source	Proceedings of the 6th International Conference of the International Association for Accident and Traffic Medicine		
publication place			

indicator desc.	AIS 4-6 body parts: head (-), spine (-), neck (+), chest (-), abdomen (-), thigh (-), pelvis and hips (-), foot and ankle (+) injuries per 1,000 occupants Note: most studies give % distribution and do not include uninjured.		
what was counted	injuries		
how it was reported	number		
how it was used	safety belt effectiveness eval.		
source records	hospital records		
body part(s) studied	head, neck/throat, neck, spine, thorax, abdomen/pelvic contents, extremities/pelvis		
severity coding	AIS		
miscellaneous related variables	seating position, belt use		
sbul link?			
results desc.	tabulate AIS 0-6 measure belted reduction % vs. expected from unbelted with severity AIS 2-6		

source institution	Transport and Road Research Laboratory Crowthorne, Berks, England
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document number	91	accession number	S-87-1356
reviewer	Benjamin	abstract only?	no

author	Sato, T.B.	year	1987
		volume	27
		number	7
		pages	754-758
		month or issue	July

title	Effects of seat belts and injuries resulting from improper use
source	Journal of Trauma
publication place	

indicator desc.	body part: head (-), face (-), neck (+), arms (-), chest (+), abdomen (+), legs (-), Hospital stay. Body part, % distribution of injuries. Hospital stay --severe defined as > or = 30 days. parameter of speed
what was counted	persons injured
how it was reported	% distribution, number
how it was used	safety belt effectiveness eval.
source records	accident records
body part(s) studied	head, face, neck/throat, neck, thorax, abdomen/pelvic contents, extremities/pelvis
severity coding	
miscellaneous related variables	belt use
sbul link?	no
results desc.	tabulate % distribution for seat belt users vs. non-seat belt use. Serious stay vs. speed of impact

source institution	National Police Agency
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document number	42	accession number	-79-0526
reviewer	Benjamin	abstract only?	no

author	Schmidt, G. Kallieris, D. Kappner, R. Mattern, R. Schult, F.	year volume number pages month or issue	1977
title	Forensic pathological and biomechanical experiences after the first year of mandatory belt wearing in the Federal Republic of Germany		
source	6th Annual Conference of the International Association of Accidents and Traffic Medicine		
publication place			

indicator desc.	per cent of all cases using seat belts
	spine injuries paraplegia, p.11 percent of all cases using seat belts
what was counted	injuries
how it was reported	% distribution, number
how it was used	literature review
source records	other literature
body part(s) studied	spine
severity coding	AIS
miscellaneous related variables	belt use
sbul link?	yes
results desc.	quoted from study

source institution	References not given
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document number	85	accession number	C-79-2629
reviewer	Benjamin	abstract only?	no

author	Seeney, K.M.	year	1977
		volume	
		number	
		pages	
		month or issue	

title	Queensland experience of compulsory wearing of seat belts
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source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine
publication place	

indicator desc.	head (-), chest (-) per cent of total injuries by body part
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what was counted	persons injured, injuries
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how it was reported	% distribution, number
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how it was used	SBUL evaluation
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source records	hospital records
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body part(s) studied	head, spine, thorax, abdomen/pelvic contents, extremities/pelvis
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severity coding	
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miscellaneous related variables	belt use
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sbul link?	yes
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results desc.	tabulates seat belt use vs. nonuse
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source institution Public Hospitals in Brisbane area, Australia

document number	70	accession number	C-87-0834
reviewer	Race	abstract only?	no

author	Sleet, D.A.	year	1984
		volume	11
		number	2
		pages	113-125
		month or issue	Summer

title	Reducing motor vehicle trauma through health promotion programming
source	Health Education Quarterly
publication place	

indicator desc.	estimated number of deaths and injuries saved (?) assumes 80 % compliance/preventable if belt use was mandated, breakdown by state
-----------------	---

what was counted	injuries saved
------------------	----------------

how it was reported	
how it was used	
source records	
body part(s) studied	
severity coding	
miscellaneous related variables	state
sbul link?	no
results desc.	issue not relevant except for attached table

source institution	Highway Users Federation
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document number	52	accession number	S-87-2293
reviewer	Fearn	abstract only?	no

author	States, J.D. Huelke, D.F. Dance, M. Green, R.N.	year	1987
		volume	27
		number	7
		pages	740-745
		month or issue	July

title	Fatal injuries caused by underarm use of shoulder belts
source	Journal of Trauma
publication place	

indicator desc.	injuries, fatal and nonfatal, to the abdomen. including those to intestines, liver, spleen, kidneys, aorta, lungs and diaphragm, from wearing belts under arm or above pelvis
what was counted	injuries
how it was reported	
how it was used	case reports
source records	hospital records, ER records
body part(s) studied	thorax, heart/lung, ribs, abdomen/pelvic contents
severity coding	
miscellaneous related variables	belt-induced injury, crash configuration, belt use
sbul link?	no
results desc.	the indicator was used to illustrate that with the increased use of seat belts that comes about as a result of seat belt laws, so also will come cases of misuse and associated injuries. case studies increase in belt use due to laws leads to increase in misuse and resulting injuries to abdomen, ribs, etc.

source institution	
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document number	62	accession number	Gurin
reviewer	Race	abstract only?	no

author	States, J.D. Ingersoll, G.L. Annechiarico, R.P. Carleen, E.D. Good, R.G. Lieou, J., et al.	year volume number pages month or issue	1986
title	The effect of the New York State safety belt law on hospital admissions in Monroe County (Rochester) New York		
source	30th Annual Proceedings of the American Association for Automotive Medicine		
publication place			

indicator desc.	injury patterns: total number, head, lower extremity injuries, serious chest/abdominal injuries health care		
what was counted	hospital admissions, hospital stays		
how it was reported	number		
how it was used	SBUL evaluation		
source records	accident records, hospital records, ER records, inpatient records		
body part(s) studied	head, face, neck/throat, neck, spine, cervical, thoracic, lumbar, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities		
severity coding	AIS, ISS, ICD		
miscellaneous related variables	belt use, alcohol		
sbul link?	yes		
results desc.	decrease in hospital admissions also. info. based on police accident reports, medical examiner or local hospital, emergency room logs, hospital records		

source institution	University of Rochester, Rochester, New York
--------------------	--

document number	66	accession number	NSC ILL
reviewer	Race	abstract only?	no

author	Stewart, A.L.	year	1981
	Ware, J.E.	volume	19
	Brook, R.H.	number	5
		pages	473-488
		month or issue	May

title	Advances in the measurement of functional status: construction of aggregate indexes
source	Medical Care
publication place	

indicator desc.	measure of physical capacities and limitations
	general disability/rehabilitation

what was counted	persons involved
------------------	------------------

how it was reported	% distribution, number, scores
how it was used	chronic limitations index
source records	special questionnaire

body part(s) studied	
----------------------	--

severity coding	
-----------------	--

miscellaneous related variables	
---------------------------------	--

sbul link?	no
results desc.	both chronic limitations and those of shorter duration

source institution	Anita Stewart
	Social Science Department
	The Health Insurance Study
	The Rand Corporation
	1700 Main Street
	Santa Monica, California 90406

document number	29	accession number	s-82-0129
reviewer	Landes	abstract only?	no

author	Tarriere, C. Leung, Y.C. Fayon, A.	year	1981
		volume	
		number	
		pages	
		month or issue	

title	Field facial injuries and study of their simulation with dummy
-------	--

source	Proceedings of the 25th STAPP Car Crash Conference, Society of Automotive Engineers, San Francisco, Calif.
publication place	

indicator desc.	face (except eye) facial/jaw injuries
-----------------	--

what was counted	injury episodes, injuries
------------------	---------------------------

how it was reported	% distribution, number
---------------------	------------------------

how it was used	epidemiological studies
-----------------	-------------------------

source records	corporate records
----------------	-------------------

body part(s) studied	head, face
----------------------	------------

severity coding	AIS
-----------------	-----

miscellaneous related variables	speed
---------------------------------	-------

sbul link?	
results desc.	

source institution	
--------------------	--

document number	9	accession number	NSC
reviewer	Miller	abstract only?	no

author	Thode, H.C. Barancik, J.I.	year	1987
		volume	
		number	
		pages	
		month or issue	

title Use of Logistic Regression in the New York State Seatbelt Law

source Presented at the 1987 Joint Statistical Meetings, San Francisco, August 1987

publication place

indicator desc. injuries by severity, part of body and nature of injury

 ties results to NY SBUL

what was counted injuries, ER visits

how it was reported rates

how it was used epidemiological studies, SBUL evaluation

source records hospital records, ER records

body part(s) studied head, face, neck/throat, neck, spine, cervical, thorax, abdomen/pelvic contents, extremities/pelvis, upper extremities, lower extremities

severity coding AIS

miscellaneous related variables injury type

sbul link? yes

results desc. document is marked "Draft, not to be cited"

 regression analysis for pre- / post-law.

 Found head and neck injuries decreased after law.
 head (-), neck (-), cervical strain with other spinal injury (-)
 Also in particular, external injuries to head decreased after law. Face (-), thorax/abdomen (+), extremities (+), cervical strain (+), nose/jaw fractures (+).

source institution all hospitals in Suffolk County, New York

 data gathered by Brookhaven National Laboratory and Department of Community and Preventive Medicine at S.U.N.Y. at Stony Brook

document number	79	accession number	S-81-0681
reviewer	Benjamin	abstract only?	no

author	Thomas, C. Faverjon, G. Henry, C. Tarriere, C. Got, C. Patel, A.	year volume number pages month or issue	1980
title	Comparative study of 1,624 belted and 3,242 non-belted occupants: results on the effectiveness of seat belts		
source	Proceedings of the 24th Conference of the American Association for Automotive Medicine		
publication place			

indicator desc.	head injuries, pelvic injuries by AIS, ejection--yes, no		
what was counted	injury episodes, injuries		
how it was reported	% distribution		
how it was used	safety belt effectiveness eval.		
source records	accident records, supplemented by in-depth investigation of accident by team		
body part(s) studied	head, thorax, abdomen/pelvis		
severity coding	AIS		
miscellaneous related variables	crash configuration, ejection, belt use, speed		
sbul link?	no		
results desc.	incidence tabulated ?? use of seat belt		

source institution

document number	120	accession number	ILL
reviewer	Miller	abstract only?	no

author	Thompson, J.F.	year	1983
	Wood, R.F.M.	volume	287
	Cahill, A.P.	number	
	Franklin, P.M.	pages	1260-1261
	Morris, P.J.	month or issue	Oct. 29

title	Kidney transplantation and seat belt legislation
source	British Medical Journal
publication place	

indicator desc.

what was counted consumption of medical supplies

how it was reported number

how it was used SBUL evaluation

source records hospital records

body part(s) studied abdomen/pelvic contents

severity coding

miscellaneous
related variables

sbul link? yes

results desc. SBULs have small effect on number of donors. Of 100 kidney donors in year before law, only 9 were car occupants

source institution

document number	81	accession number	C-79-2624
reviewer	Benjamin	abstract only?	no

author	Toomath, J.B.	year	1977
		volume	
		number	
		pages	
		month or issue	

title	Compulsory seat belt legislation in New Zealand
-------	---

source	6th International Conference of the International Association for Accidents and Traffic Medicine
publication place	

indicator desc.	body part: head(-), neck(+), trunk(+), ejections(-), trunk (+), shoulder (-), steering wheel (+), also mechanisms of injury
-----------------	---

what was counted	injury episodes
------------------	-----------------

how it was reported	% distribution
---------------------	----------------

how it was used	SBUL evaluation
-----------------	-----------------

source records	accident records
----------------	------------------

body part(s) studied	
----------------------	--

severity coding	
-----------------	--

miscellaneous related variables	belt use
---------------------------------	----------

sbul link?	yes
------------	-----

results desc.	tabulated percentages of total injuries ascribed to indicator
---------------	---

source institution	National Statistics Traffic Research New Zealand
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document number 98
reviewer Benjamin

accession number C-80-3588
abstract only? no

author Trinca, G.

year 1980
volume 8
number
pages 36-38
month or issue

title Medical aspects of seat belt usage

source Journal of Traffic Medicine

publication place

indicator desc. severity, ejection, head (-), face (-), chest (-),
eye injuries (-), spinal cord (-), knee and thigh (-),
sternum fractures (+)

literature review

indicators not defined
some percentages given

what was counted

how it was
reported

how it was used

source records

body part(s)
studied

severity coding

miscellaneous
related variables

sbul link? no

results desc. quoted from a number of articles

source institution Gordon W. Trinca, OBE, MBBS, FRACS
Chairman, National Road Trauma Committee
Royal Australasian College of Surgeons
Senior Surgeon, Preston & Northcote Community Hospital
Melbourne, Australia

document number	23	accession number	C-84-1309
reviewer	Miller	abstract only?	no

author	Trinca, G.W.	year	1984
		volume	
		number	
		pages	
		month or issue	

title	Thirteen years of seat belt usage: how great the benefits
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source	Advances in Belt Restraint Systems: design, performance, and usage; Society of Automotive Engineers Int. Congress
publication place	Warrendale, Pennsylvania

indicator desc.	number and severity of head and chest injuries, number of MV injuries treated at hospitals.
	experience in Victoria, Australia,
	effects of SBUL in Australia

what was counted	hospital admissions, hospital stays, ER visits, injuries
------------------	--

how it was reported	% distribution
---------------------	----------------

how it was used	SBUL evaluation
-----------------	-----------------

source records	hospital records, ER records, accident records
----------------	--

body part(s) studied	head, thorax
----------------------	--------------

severity coding	AIS, MAIS
-----------------	-----------

miscellaneous related variables	belt use
---------------------------------	----------

sbul link?	yes
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results desc.	% distributions by part of body for users and nonusers.
	head (-), chest (+/-), hospital admissions (-)

source institution	hospital data from Australia
	Preston and Northcote Community Hospital

document number	107	accession number	C-77-2464
reviewer	Race	abstract only?	no

author	Trincea, G.W. Dooley, B.J.	year	1975
		volume	1
		number	
		pages	675--678
		month or issue	May 31

title The effects of mandatory seat belt wearing on the mortality and pattern of injury of car occupants involved in motor vehicle crashes in Victoria

source Medical Journal of Australia

publication place

indicator desc. general breakdown of injury types for front and side impacts
 hospital admissions

what was counted hospital admissions, hospital stays, ER visits

how it was
reported

how it was used SBUL evaluation

source records hospital records

body part(s)
studied thorax, sternum, abdomen/pelvic contents, extremities/pelvis, pelvis

severity coding

miscellaneous
related variables belt-induced injury, crash configuration

sbul link? yes

results desc. basic injury information

source institution Preston and Northcote Community Hospital, Victoria, Australia
 Road Trauma Committee of the Royal Australasian College of Surgeons

document number	73	accession number	S-88-0718
reviewer	Benjamin	abstract only?	no

author	Tunbridge, R.J. Everest, J.T. Wild, B.R. Johnstone, R.A.	year	1988
		volume	
		number	
		pages	
		month or issue	

title An in-depth study of road accident casualties and their injury patterns

source Transport and Road Research Laboratory, Department of Transport, United Kingdom

publication place

indicator desc. MAIS, ejection, entrapment
 MAIS 0-6, fatal
 EMS reports
 ejections

what was counted hospital admissions, hospital stays, ER visits, injuries, disability days

how it was reported % distribution, number

how it was used other evaluation

source records hospital records, ER records

body part(s) studied

severity coding MAIS

miscellaneous related variables seating position, ejection

sbul link? no

results desc. tabulate AIS vs. belted and unbelted. Also has information on body part distribution for MAIS > or = 3 by location for belted only

source institution Accident Service
 John Radcliffe Hospital
 Oxford, England

document number	111	accession number	S-87-0402
reviewer	Benjamin	abstract only?	no

author	Vallet, G. Ramet, M. Debiez, G.	year volume number pages month or issue	1986
title	Seat belt efficiency: paired case study with unbelted and belted occupants		
source	Proceedings of the IRCOBI Conference, 1986		
publication place			

indicator desc.	accident severity, MAIS front occupants
what was counted	
how it was reported	
how it was used	safety belt effectiveness eval.
source records	
body part(s) studied	
severity coding	AIS, OAIS
miscellaneous related variables	crash configuration, belt use, seating position
sbul link?	no
results desc.	paired by accident severity (vehicle damage index) seat belt vs. non seat belt AIS

source institution	Laboratoire des Chocs et de Biomecanique FRANCE
--------------------	--

document number	108	accession number	C-76-3116
reviewer	Race	abstract only?	no

author	Vaughan, R.G. Wood, R. Croft, P.G.	year	1974
		volume	7
		number	5
		pages	103-127
		month or issue	

title	Some aspects of compulsory seat belt wearing
source	ARRB Proceedings
publication place	

indicator desc.	injury patterns, don't know if data based on lap or lap-shoulder belt
-----------------	--

what was counted	persons injured, hospital stays, hospital admissions, hospital bed-days, accidents
how it was reported	averages, number
how it was used	SBUL evaluation
source records	hospital records

body part(s) studied	head, cranium, neck/throat, neck, spine, thorax, sternum, extremities/pelvis, upper extremities, lower extremities, pelvis
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severity coding	
miscellaneous related variables	

sbul link?	yes
results desc.	see specifically paragraphs 26 through 40

source institution	Accident Analysis Section Traffic Accident Research Unit Department of Motor Transport New South Wales, Australia
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document number	51	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Vellar, I.D. Vellar, D.J. Mullany, C.J.	year	1976
		volume	1
		number	19
		pages	694-696
		month or issue	May 8

title	Rupture of the bowel due to road trauma
source	Medical Journal of Australia
publication place	

indicator desc.	rupture of the bowel (+) surgical diagnosis abdominal injuries
what was counted	hospital admissions, hospital stays
how it was reported	number
how it was used	case reports
source records	hospital records, inpatient records
body part(s) studied	head, face, abdomen/pelvic contents
severity coding	
miscellaneous related variables	vehicle parts, belt use
sbul link?	no
results desc.	case reports 1956-June 1976. 1956-1970, 5 cases, all no belts. 1971-1975, 11 cases, 8 with belts severe head injuries (-) severe face injuries (-) rupture of the bowel (+)

source institution	St. Vincent's Hospital, Melbourne, Australia
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document number	30	accession number	S-85-0064
reviewer	Hoskin	abstract only?	no

author	Vernon, S.A. Yorston, D.B.	year	1984
		volume	77
		number	3
		pages	198-200
		month or issue	March

title	Incidence of ocular injuries from road traffic accidents after introduction of seat belt legislation
source	Journal of the Royal Society of Medicine
publication place	

indicator desc.	To assess change in pattern of eye injuries follow SBUL eye injuries (incidence/nature)
what was counted	ER visits
how it was reported	number
how it was used	epidemiological studies
source records	hospital records, ER records, inpatient records
body part(s) studied	face, eye
severity coding	
miscellaneous related variables	belt use, vehicle parts
sbul link?	yes
results desc.	eye injuries (-)

source institution	
--------------------	--

document number	117	accession number	Gurin
reviewer	Fearn	abstract only?	no

author	Waltham-Newton Tribune	year	1986
		volume	
		number	
		pages	
		month or issue	

title	Newton-Wellesley Hospital helps with study
source	Waltham-Newton Tribune, 11-6-86
publication place	

indicator desc.	treatment cost of rehabilitation total medical costs of accident victims total medical costs of belted vs. unbelted occupants and pre-/post-law
what was counted	ambulance runs, costs
how it was reported	% distribution, averages
how it was used	safety belt effectiveness eval., SBUL evaluation
source records	hospital records
body part(s) studied	
severity coding	
miscellaneous related variables	belt use
sbul link?	yes
results desc.	examined effects of belt wearing on total medical costs of accident victims preliminary data indicated as much as a 25 % reduction in medical costs during a 4-month period following implementation of the law

source institution	Dr. Charlotte Yeh Massachusetts Chapter of Emergency Physicians
--------------------	--

document number	87	accession number	S-79-0527
reviewer	Benjamin	abstract only?	no

author	Walz, F. Niederer, P. Zollinger, U. Renfer, A.	year volume number pages month or issue	1977
title	Analysis of 115 killed and 205 severely injured (OAI5 > or = 2) seat belt users		
source	Proceedings of the 6th International Conference of the International Association of Accidents and Traffic Medicine		
publication place			

indicator desc.	body parts, AIS percent of total injuries AIS > or = 2		
what was counted	injuries		
how it was reported	% distribution, number		
how it was used	safety belt effectiveness eval.		
source records	accident records, hospital records		
body part(s) studied	head, face, spine, cervical, thoracic, lumbar, thorax, abdomen/pelvic contents		
severity coding	AIS, OAI5		
miscellaneous related variables	ejection, belt use, crash configuration		
sbul link?	no		
results desc.	cataloguing of injuries in seat belt users, tabulations of percent distributions by body part		

source institution	Institute of Forensic Medicine University of Zurich Swiss Federal Police Department
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document number	46	accession number	NSC ILL
reviewer	Race	abstract only?	no

author	Watson, N.	year	1983
		volume	21
		number	1
		pages	63-64
		month or issue	Feb. 1

title	Road traffic accidents, spinal injuries and seat belts
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source	Paraplegia
publication place	

indicator desc.	spine injuries (motor-vehicle related)
	Australian/U.K. experience

what was counted	injuries, costs
------------------	--------------------

how it was reported	
---------------------	--

how it was used	
-----------------	--

source records	hospital records, inpatient records
----------------	--

body part(s) studied	spine
----------------------	-------

severity coding	
-----------------	--

miscellaneous related variables	ejection
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sbul link?	No
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results desc.	probability of spinal injury if ejected
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source institution	Spinal Injuries Unit Lodge Moor Hospital Sheffield 10 England
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document number	71	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Wild, B.R. Kenwright, J. Rastogi, S.	year	1985
		volume	290
		number	6482
		pages	1621-1623
		month or issue	

title	Effect of seat belts on injuries to front and rear seat passengers
source	British Medical Journal
publication place	

indicator desc.	effect of injury by passenger to passenger collision. definition of indicator not clear. "injury", incidence of injury occupant-to-occupant injuries
what was counted	injuries
how it was reported	
how it was used	safety belt effectiveness eval.
source records	
body part(s) studied	
severity coding	
miscellaneous related variables	occupant-to-occupant contact, seating position
sbul link?	no
results desc.	2,520 occupants of cars, front and rear seat passenger interaction by seat belt and no seat belt. Restraints decrease injury incidence

source institution	Oxford Road Accident Group John Radcliff Hospital, Oxford, England
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document number	57	accession number	DIALOG
reviewer	Benjamin	abstract only?	yes

author	Wojcik, J.B. Morgan, A.S.	year	1988
		volume	17
		number	9
		pages	912-914
		month or issue	September

title	Sternal fractures--the natural history
source	Annals of Emergency Medicine
publication place	

indicator desc.	ribs/sternum/pelvis bruised/fractured sternum
-----------------	--

what was counted	hospital admissions, hospital stays
------------------	-------------------------------------

how it was reported	% distribution, number
---------------------	------------------------

how it was used	case reports
-----------------	--------------

source records	hospital records
----------------	------------------

body part(s) studied	thorax, heart/lung, sternum, ribs
----------------------	-----------------------------------

severity coding	
-----------------	--

miscellaneous related variables	belt use
---------------------------------	----------

sbul link?	
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results desc.	66 cases, 59 % in mv accidents most did not wear seat belts. 18% myocardial contusion
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source institution	Trauma Unit, St. Vincent Hospital, Hartford, Connecticut
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PART B

EXPERT TEAM COMMENTS ON INDICATORS

[See page B-71 for an index of indicators included in Part B.]

Notes: Numbers (e.g., 33) are used to identify expert team members. The same number is used for a particular expert in all parts of this report.

A summary of the expert team ratings of each indicator may be found in Volume I, Appendix D.

Indicators were rated as follows:

- + = an indicator with promise that should be fully explored.
- 0 = an indicator with unknown promise that should be given some attention during the project.
- = an indicator with little or no promise that should be eliminated from further consideration during this project.

DK = no opinion about this indicator (includes no response).

Items marked 0/+ and 0/- were tallied as 0.

Indicator: INCIDENCE OF ACCIDENT REPORTS -- BY POLICE -- BY
DRIVER

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	0	
2	0	I don't believe accidents are prevented by seat belt usage but (hopefully) seat belt usage displays less severe injury results in accidents
4	+	
5	0	ok (probably/in non-law states probably useless because of "lie" factor in belt law states
7	+	
8	+	this will be necessary to derive a denominator for other indicators # ejections/crashes
9	+	
12	+	
13	0	
18	-	
19	-	not very useful unless belt use & injury severity recorded reliably by police
25	+	provides basic ref. data
26	+	to show changes in distributions of severity of injuries pre- and post-belt law
28	-	too ambiguous and prone to reporting levels and artifacts
29	-	Do you mean accidents involving injuries - not just accidents - Seat belts are not intended to reduce as per se.
30	-	the indicators rated (-) seem to be based on numbers of accidents or occupants involved in accidents which Mul would not be expected to affect to any great extent, or are surrogate measures for accident severity for which other more precise, measure may be available
31	+	
33	+	especially if injury severity is assessed by improved scale, i.e., New York -problem may be slow input
35	0	
37	-	unless objective indication of belt use is implemented
38	+	subject to reporting bias
Unknown	0/+	increasing, with SBUL in effect, we see all drivers claiming belt use
Unknown	-	

Indicator: INCIDENCE OF EMERGENCY MEDICAL SERVICE (EMS)
CALLS FOR CRASHES; FREQUENCY/RATE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	Do not expect crashes to decrease but can look at injury crashes, vs. property crashes & combine with Trauma Center data.
2	0	
4	+	
5	-	too weak an indicator by itself to detect change
7	dk	
8	0	
9	-	
12	+	
13	0	
18	-	
19	0	need to distinguish between occupants and non-occupants
25	+	Provides basic ref. data
26	+	
27	-	wide variability or service availability rural/urban would miss persons arriving by private vehicle
28	+	
29	-	
30	-	
31	+	
33	+	
35	0	
37	-	Biased to minor/moderate severity accidents which belt use may not affect
38	-	difficult to get EMT observations/would have to rely on victim self report or police rept.
Unknown	+	
Unknown	+	

Indicator:

AMBULANCE RUN REPORTS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	Meaningless
2	+	
4	0	could supplement primary data, from eg police
5	+	maybe they could get belt use on a less biased basis
7	dk	
8	0	
9	+	
12	+	
13	0	
18	-	
19	-	
25	+	must be designed to reflect safety belt usage
26	+	
27	0	currently lacks uniform data set and documentation is often sub standard or incomplete
28	0	
29	dk	This is non-specific - what would you be looking for here?
30	-	
31	+	
33	NR	How is this indicator different from EMS call reports
35	-	
37	-	Biased to minor/moderate severity accidents that belt use may not affect.
38	+	
Unknown	+	
Unknown	+	

Indicator: TRAUMA SCORE (CHAMPION, 1981)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1		(not in isolation)
2	+	
4	dk	
5	-	bias; based on those who show up at the hospital
7	0	
8	+	use with the Injury Severity Scale (155) to compare injury severity of populations pre and post belt laws
9	-	
12	+	
13	0	
18	+	
19	dk	
25	0	poor indicator
26	+	
27	+	
28	+	
29	dk	Not intended for police use - EMS personnel
30	dk	
31	+	Would need to be careful that all are using the Trauma Score and not the Revised Trauma Score - if the latter? weighted or unweighted?
33	+	would improve discrimination of EMS reports and permit stratification
35	0	
37	+	Assessing changing patterns/severity of injury is important
38	dk	
Unknown	0	
Unknown	+	

Indicator: NUMBER/PERCENT OF CASES TRANSPORTED BY AMBULANCE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	meaningless
2	0	
4	NR	is this not included in ambulance run reports?
5	0	maybe
7	dk	
8	0	
9	-	
12	+	
13	-	extremely sensitive to variations in practice/rules for EMS
17	NR	
18	+	Add <u>MVA</u> to Indicator Name
19	-	too unspecific
25	0	
26	+	
27	-	as above: variability, poor documentation
28	0	
29	-	
30	-	
31	+	number rather than percent
33	-	no satisfactory (uniform) bottom line
35	-	
37	-	Biased to minor/moderate severity accident that belt use may not affect
38	-	how do you relate this to belt use, may be proxy measure
Unknown	+	
Unknown	-	

Indicator:

HELICOPTER RUN REPORTS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	very small sample
2	dk	
4	-	
5	-	bias; only done in certain biased instances
7	-	
8	0	
9	-	
12	-	expect numbers are too small
13	-	
18	-	
19	-	to unspecific
25	+	useful if other EMS data are gathered as well
26	0	probably too few cases?
27	0	many confounding factors & poor documentation & utilization due to: 1) more air medical service available 2) hospital marketing 3) pressure, medical/ legal pressures 4) distance vs. level of care concerns
28	-	too infrequent - dependent on regional differences in helicopters
29	-	
30	-	Helicopter transfer is a function of how trauma system is organized and triage definitions
31	+	
33	-	Non uniform guidelines for dispatch - Most of country not covered
35	-	
37	dk	probably too few numbers
38	-	how do you relate this to belt use, may be proxy measure
Unknown	-	Not representative of general population
Unknown	+	Threshold for helicopter transfer dependent on many factors most SBU info is second hand

Indicator: NUMBER/PERCENT OF CASES TRANSPORTED BY
HELICOPTER

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	dk	
4	-	
5	-	
7	-	
8	-	
9	-	
12	-	expect numbers are too small
13	-	
18	-	add MVA to Indicator name
19	-	too unspecific
25	+	useful if other EMS data is gathered as well
26	dk	
27	0	many confounding factors & documentation utilization due to 1) more air medical service available 2) hospital marketing pressure 3) medical/legal pressures 4) distance vs. level of care concerns
28	-	too infrequent dependent on regional differences in helicopter
29	-	
30	-	
31	+	Number rather than percent
33	-	Non uniform guidelines for dispatch
35	-	
37	dk	probably too few numbers
38	-	how do you relate this to belt use, may be proxy measure
Unknown	-	Threshold for helicopter transfer dependent upon many factors, including Eton use. Also, most are secondary transfers-most SBU info is second hand
Unknown	-	

Indicator: NUMBER/RATE OF EJECTIONS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	0	the number of ejections may be significantly related to belt usage but is that what the variable implies?
4	+	
5	+	good; if you can get it
7	0	
8	+	
9	+	
12	+	
13	+	but need criteria regarding partial ejection
18	+	
19	+	should decrease as belt use increases but it may be difficult to determine whether ejection occurred
25	+	
26	+	
27	+	
28	+	
29	+	Assumes baseline data
30	0	
31	+	number rather than percent
33	+	
35	0	
37	+	good measure if properly reported
38	+	has promise. Would you collect from police reports?
Unknown	+	
Unknown	+	

Indicator: EMS REPORTED BELT-USE AMONG CRASH VICTIM;
PERCENT OF BELT WEARERS FOUND AMONG CRASH
VICTIMS AND FATALITIES

Expert	Rating	Comments
1	+	
2	+	
4	+	potentially useful, may be problems with reliability especially if there are insurance implications
5	+	maybe
7	0	
8	+	our experience has shown this to be relatively unreliable but somehow belted vs. unbelted must be determined if we intend to compare injury severity
9	+	
12	+	
13	0	
18	+	
19	+	as long as belt use is reported reliably by EMS staff
25	+	
26	0	how often do EMS record this information? may lack reliability if EMS not the first on the Scene
27	+	often the only source to verify
28	+	
29	+	Particularly useful in assessing belt use in serious crashes
30	0/+	
31	+	The belted status of crash victim is important. Our experience is that patients' answers to medical personnel appear to be reasonably truthful & accurate. Fairly high motivation is required by paramedics or ER staff to collect this info in every case.
33	+	
35	0	
37	-	Unless objective indication of belt use is achieved**
38	+	Has promise would you collect from police reports
Unknown	0	see indicator "Helicopter run reports" I have little faith in SBU or speed as reported by victims
Unknown	+	

Indicator:

EMERGENCY ROOM VISITS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	for MV Occupant trauma
2	0	
4	0	depends on scope of data collected
5	-	probably too crude to detect change
7	0	
8	0	total of visits/# accidents of given severity could provide crude measure of injury severity
9	-	
12	dk	changes could be due to many causes
13	0	
18	-	
19	0	need to specify occupants of vehicle
25	0	would require reorientation of personnel
26	+	
27	+	
28	-	Too ambiguous and insensitive unless limited to traffic accident trauma
29	+	Assume baseline data (before/after comparisons)
30	+	
31	+	
33	+	useful if based on defined population
35	0	
37	-	Could be ok but biased to minor & moderate severity accidents that safety belt use may not affect.
38	+	how do you relate to belt use potential as proxy measure
Unknown	0/+	high importance
Unknown	-	

Indicator: REDUCTION OR CHANGE IN TYPE OR NATURE OF VISIT
FOR MVA

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	Change in numbers for MV trauma over time
2	+	
4	+	
5	0	maybe
7	-	
8	0	could see an increase or decrease in less severe injuries
9	+	
12	dk	changes could be due to many causes
13	+	but sensitive to reporting customs
18	+	Add MVA to indicator name
19	0	need to specify occupants of vehicle
25	0	
26	+	
27	+	
28	+	
29	+	Assumes baseline data (before and after comparisons)
30	dk	
31	+	
33	+	
35	+	
37	+	Assessing changing patterns/sensitivity of injury is important
38	+	how do you relate to belt use potential as proxy measure
Unknown	0/+	
Unknown	-	

Indicator: NUMBER OF CASES TREATED VERSUS NUMBER ADMITTED

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	NR	Look at percentage of admissions overtime
2	0	
4	-	
5	-	This ratio might be unchanged even if belt use increases greatly
7	0	
8	+	# admitted/total seen is a crude measure of severity
9	+	
12	dk	changes could be due to many causes
13	0	very sensitive to hospital, census, customs, billing practices
18	+	Add MVA to indicator name
19	+	need to specify occupants of vehicle
25	+	
26	+	
27	+	
28	0	
29	+	Assumes baseline data (before and after comparison)
30	+	
31	+	
33	0	This should be tested with existing data file: i.e., J. Barancik's
35	0	
37	dk	problem with conservative treatment of head injury
38	+	
Unknown	0/+	this is where the money is!
Unknown	-	

Indicator: AVERAGE VEHICLE OCCUPANT TREATMENT COSTS --
OVERALL AND BETWEEN THOSE ADMITTED AND THOSE
RELEASED

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	cost data extremely difficult
2	-	
4	+	Useful if reliably broken down by belt use
5	0	maybe
7	+	
8	+	
9	-	
12	dk	changes could be due to many causes
13	-	very sensitive to hospital, census, customs, billing, practices
18	+	
19	+	better if belt use could be determined by examining victim for belt induced marks, bruises, burns
25	0	
26	+	
28	+	
27	+	
29	0	Treatment costs would have to be standardized across hospitals. Estimating cost without info on crash severity is incomplete data. Could be very powerful if the circumstances of crash were also known (e.g., seating position, DV, type of crash configuration etc.
30	0	severity of injury and cost of treatment may not be consistent
31	-	There may be no change in proportion of admissions & release and yet the law may have been effective in decreasing mortality
33	0	No better than measuring treatment cases vs. admissions
35	+	
37	+	emphasizes the importance of the word "cost" in the matter
38	-	do not see potential
Unknown	0/+	
Unknown	-	

Indicator: BLOOD TRANSFUSIONS/COMPONENT CONSUMPTION

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	no use
2	0	
4	dk	
5	-	probably not
7	-	
8	0	a measure of expended resources and perhaps a measure of injury severity
9	-	
12	dk	changes could be due to many causes
13	-	very sensitive to hospital, census, customs, billing, practices
18	-	
19	-	
25	-	
26	dk	
27	+	
28	-	too insensitive
29	dk	
30	dk	
31	-	some who would have died now stay alive and need blood transfusions
33	-	therapeutic technology is changing too rapidly
35	+	
37	dk	
38	-	do not see potential
Unknown	0/+	too many factors at work, much regional variation. AIDS has changed use dramatically
Unknown	-	

Indicator: HOSPITAL/INPATIENT ADMISSIONS: FREQUENCY/RATE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	not in general
2	0	
4	no rating	Only if vehicle occupants can be identified and belt use known
5	dk	
7	0	
8	+	
9	+	
12	+	
13	-	
18	+	
19	-	
25	-	
26	+	
27	0	insurance companies have different criteria to allow for admission, so results may be confounded
28	-	
29	+	Assumes baseline data & knowledge about belt use/non-use
30	+	
31	+	
33	+	
35	0	
37	+	cost/utilization driven measures are good
38	no rating	only if related to admission diagnosis
Unknown	0	
Unknown	0	

Indicator: HOSPITAL BED OCCUPANCY RATE/PERCENT

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	not in general
2	dk	
4	no rating	useful only if occupants and belt use info is known
5	+	maybe, MV related only
7	-	
8	-	
9	+	
12	+	
13	NR	
18	+	for MVA
19	no rating	
25	-	
26	-	
27	0	hospitals are continuously manipulating # acute vs. # skilled beds to qualify for economic & political pressures & incentives. This could be confusing
28	-	
29	+	Assumes baseline data & info about use & non-use of belt at time of crash
30	dk	
31	dk	see note attached
33	0	needs testing -? appropriate date file, all hospital admission rates are steadily decreasing
35	0	
37	+	cost/utilization driven measures are good
38	-	no use
Unknown	0	beware our expected shift in age groups may be a confounder
Unknown	-	

Indicator: NUMBER OF HOSPITAL BED-DAYS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	0	
4	no rating	useful only if occupants can be identified and belt use known
5	+	maybe, MV related only
7	-	
8	+	a measure of resource utilization & severity
9	-	
12	+	
13	-	
18	+	Add MVA to indicator name
19	no rating	
25	-	
26	-	
27	-	
28	-	
29	NR	
30	dk	
31	+	
33	0	
35	0	
37	no rating	cost/utilization driven measures are good
38	no rating	only if you can relate to MV induced trauma
Unknown	0	
Unknown	+	

Indicator: AVERAGE HOSPITAL BED-DAYS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	-	
4	no rating	
5	+	maybe, MV related only
7	-	
8	+	
9	-	
12	+	
13	-	
18	+	for MVA
19	+	occupants only
25	-	
26	-	
27	+	
28	-	
29	NR	
30	0	
31	dk	
33	0	
35	0	
37	no rating	cost/utilization measures on good
38	no rating	only if you can relate to MV induced trauma
Unknown	dk	
Unknown	+	

Indicator: FREQUENCY/PERCENT OF CASES INVOLVING SURGICAL INTERVENTION

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	dk	
4	no rating	
5	+	maybe, MV related only
7	-	
8	+	a measure of resource utilization & severity
9	-	what kind of "intervention"?
12	+	
13	-	a very awkward denominator
18	+	MVA
19	+	Identify occupants only
25	0	Probably not useful in isolation
26	+	for motor-vehicle related cases only
27	+	
28	-	
29	-	
30	dk	surgical intervention - severity of injury?
31	-	Doubt if this would be of value
33	0	Should be tested on Barancek data
35	0	
37	-	biased to minor cuts unless there is an injury severity threshold
38	-	
Unknown	0/+	
Unknown	+	

Indicator: MOTOR VEHICLE-RELATED ADMISSIONS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	For these # of days/1CV days
2	+	
4	no rating	Only if occupants can be identified and belt use data known
5	+	maybe, MV related only
7	0	
8	+	needed to distinguish from other causes so that the other indications can be utilized & make sense
9	+	
12	+	
13	0	
18	+	
19	no rating	
25	0	Probably not useful in isolation
26	+	
27	+	
28	+	
29	NR	Isn't this the whole issue
30	+	
31	+	
33	+	
35	0	
37	-	Biased to minor/moderate severity accidents, which belt use may not affect
38	+	if you can collect, potentially related to "E" codes
Unknown	0/+	
Unknown	+	

Indicator: ABBREVIATED INJURY SCALE (AIS) CLASSIFICATION BY
BODY REGION (SEE BELOW)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	all injuries should be AIS coded
2	+	
4	+	
5	dk	might not change among those who arrive at hospital for treatment
7	0	
8	+	Will enable identification of change in injury patterns, e.g., perhaps less head injuries post law
9	+	
12	+	
13	+	
18	+	
19	+	
25	0	AIS may be useful but significant logistical problems exist with non-participating institutions
26	+	
27	+	
28	+	
29	+	Many hospitals already use AIS, which makes hospital injury data an excellent emerging standardized source of info.
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	+	
33	+	will identify body areas at risk, requires trained coder, done only on a few institutions
35	+	
37	+	this type of data is vital
38	+	
Unknown	0/+	
Unknown	+	

Indicator: CLASSIFICATION BY INJURY SEVERITY AIS-1 TO AIS-6
(MINOR TO MAXIMUM)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	+	
4	+	
5	no rating	all of these questionable because based only on patients who show up at hospital. Those whom the belt help don't come in
7	0	
8	0	
9	+	
12	+	
13	+	
18	+	
19	+	
25	0	
26	+	
27	+	
28	+	
29	+	AIS being used by many hospitals - makes hospital injury data an excellent emerging source for standardized info
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	+	
33	+	will permit establishment at bottom line & stratification, requires trained coder, done only on a few institutions
35	+	
37	+	this type of data is vital
38	+	
Unknown	0/+	
Unknown	+	

Indicator: ASSESSMENT OF MULTIPLE INJURIES: MAXIMUM AIS
(MAIS) CODES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	+	
4	+	
5	no rating	all of these questionable because based only on patients who show up at hospital. Those whom the belt help don't come in
7	0	
8	dk	
9	+	
12	+	
13	+	
18	+	
19	+	
25	0	
26	+	
27	+	
28	+	
29	0	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	+	
33	+	Requires trained coder, done only on a few institutions
35	+	
37	+	this type of data is vital
38	+	
Unknown	0/+	
Unknown	+	

Indicator: INJURY SEVERITY SCORES (ISS)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	+	
4	+	
5	no rating	all of these questionable because based only on patients who show up at hospital. Those who the belt help don't come in
7	0	
8	+	
9	+	
12	+	
13	+	
18	+	
19	+	
25	+	
26	+	
27	+	
28	+	
29	+	
30	dk	believe that changes in injury severity and location of injuries are important indicators of MVL impact not familiar enough with any of these to assess relative usefulness etc.
33	+	Requires trained coder, done only on a few institutions
35	+	
37	+	this type of date is vital
38	+	
Unknown	0/+	
Unknown	-	

Indicator: PROBABILITY OF DEATH SCORE (PODS)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	0	
4	dk	
5	no rating	all of these questionable because based only on patients who show up at hospital. Those whom the belt help don't come in
7	0	
8	+	
9	dk	
12	+	
13	0	
18	+	
19	dk	
25	0	
26	dk	
27	+	
28	+	
29	-	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	+	
33	+	requires trained coder, done only on a few institutions
35	0	
37	-	this type of data is vital but in some ways "treatment" quality driven
38	+	
Unknown	0/+	
Unknown	-	

Indicator: MOTOR VEHICLE EXTERNAL (E) CODES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	*E Codes Superior
2	0	
4	+	
5	+	maybe
7	+	
8	0	
9	+	
12	+	
13	0	
18	+	
19	+	
25	+	
26	dk	
27	+	
28	dk	
29	+	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	no rating	Might help in seeing that any drivers & passengers of cars entered into study, but better if exact seating position can be established and area of main impact to car
33	+	requires trained coder, done only on a few institutions - now available in N.Y. for hospital admissions
35	+	
37	+	this type of data is vital
38	+	
Unknown	0/+	needed on out patient visits
Unknown	+	

Indicator: NATURE OF DISEASE (N) CODES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	-	
5	dk	
7	+	
8	dk	
9	+	
12	+	
13	-	
18	+	
19	dk	
25	0	
26	dk	
27	+	
28	dk	
29	+	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	+	Though other systems of coding may be preferable, e.g., SNOMED
33	-	Not relevant. Requires trained coder done only on a few institutions
35	0	
37	+	this type of data vital
38	dk	
Unknown	dk	
Unknown	0	

Indicator: OCCUPANT-TO-OCCUPANT INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	dk	
4	-	
5	+	maybe
7	+	
8	dk	does this mean each index pt is referred to other car occupants (which serve as control)?
9	-	
12	+	
13	+	
18	+	
19	0	
25	0	
26	-	
27	+	
28	dk	
29	0	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	no rating	Suitable for small in-depth study not for mass statistics
33	dk	
35	0	
37	-	
38	NR	
Unknown	0/+	
Unknown	+	

Indicator: INTERNATIONAL CLASSIFICATION OF DISEASES (ICD -
9 CM) TO AIS 85 SCORES: CONVERSION TABLE
(MACKENZIE ET AL 1986)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	dk	
4	dk	
5	dk	
7	dk	
8	+	certainly more available than AIS/ISS codes but some loss of accuracy
9	dk	
12	+	
13	0	
18	+	
19	dk	
25	+	
26	+	
27	+	
28	+	
29	-	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	dk	
33	0	1/3 of ICD's lack specificity. Needs testing
35	0	
37	+	
38	dk	
Unknown	0/+	
Unknown	-	

Indicator: AIS 85: CONDENSED CHART CLASSIFICATIONS CODES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	dk	
5	dk	
7	dk	
8	0	
9	dk	
12	+	
13	0	
18	+	
19	dk	
25	+	
26	dk	
27	+	
28	+	
29	-	
30	dk	not familiar enough with any of these to assess relative usefulness, etc.
31	dk	no personal experience
33	+	simplifies severity scaling
35	+	
37	no rating	
38	dk	
Unknown	0	how valid?
Unknown	-	

Indicator: GENERAL SHIFTS/CHANGES IN SEVERE/MODERATE/MINOR
INJURY PATTERNS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	0	
4	+	This is a fundamental type of analysis
5	+	Yes, by all means, if from an unbiased source like reports of <u>all</u> MV crashes
7	+	
8	+	How do you obtain this?
9	-	
12	+	
13	0	
18	+	Add MVA to indicator name
19	+	
25	+	
26	+	
27	+	
28	+	
29	+	
30	+	good indicator if injury classifications are reliable
31	+	
33	+	requires severity scaling
35	+	
37	-	better done w/AIS
38	+	
Unknown	0/+	
Unknown	+	

Indicator: SKIN (INCLUDES ABRASIONS, CONTUSIONS, LACERATIONS)

Expert	Rating	Comments
1	no rating	see note attached
2	dk	
4	+	some information about types of injury and body regions is helpful. Excessive clinical detail is not productive, however legislators & drivers are more interested in how many people will not be injured rather than the precise injury reduction
5	-	
7	0/+	
8	-	
9	-	
12	+	
13	0	
18	-	
19	0	could check injury victim for signs of having been belted during accident
25	+	"seat belt" sign especially helpful for confirmation
26	+	
27	+	
28	-	
29	NR	
30	dk	
31	+	
33	-	not recorded uniformly
35	+	
37	-	
38	+	potential if can show correlation - use/non-use
Unknown	0/+	"air bag" brush burn will increase but will need to be extracted from out-patient data sources
Unknown	+	

Indicator: BURNS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	-	
7	0	
8	-	I think we'd be looking for changes (pre & post belt law) in injuries that have, immediate life threatening consequences or long term disabilities
9	-	
12	+	
13	-	
18	-	
19	0	
25	-	
26	-	
27	0	
28	-	
29	NR	
30	dk	
31	+	
33	-	frequency too low
35	0	
37	-	
38	-	do not think so
Unknown	dk	
Unknown	-	

Indicator: CRANIUM (INCLUDES FRACTURES)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	it is unclear to me how location of injury would be a good predictor at seat belt usage alone (i.e., type of accident)
4	no rating	
5	+	
7	0	
8	-	
9	+	
12	+	
13	+	
18	+	
19	+	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	0	
31	+	
33	+	probably
35	+	
37	+	Too few data annual & biased to very severe crashes leads to costs
38	+	potential if can show correlation use/non-use
Unknown	0	
Unknown	+	

Indicator: BRAIN INJURIES: COMA (GLASGOW SCALE) AMNESIA
3RD/4TH COLLISIONS OTHER MAJOR INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	
7	0	
8	+	
9	+	
12	+	
13	+	
18	+	
19	+	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	0	
31	+	maybe difficult to get widespread accurate data. HAIS Available
33	+	probably
35	+	
37	+	too few data annual & biased to very severe crashes leads to costs
38	+	potential if can show correlation - use/non-use unclear
Unknown	0/+	
Unknown	+	

Indicator: FACE TISSUE/WHOLE AREA

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	should decline
7	0	
8	0	
9	+	
12	+	
13	0	
18	-	
19	+	
25	+	studied at UT medical ctr - knoxville & presented Jan '89 (copy attached & abstract)
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	0	
35	+	
37	-	
38	no rating	
Unknown	0/+	face steering wheel contacts important here
Unknown	+	

Indicator: FACIAL BONE/CRANIUM SEPARATIONS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	should decline
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	+	
25	+	studied at UT Medical Ctr - Knoxville & presented Jan '89 copy attached & abstract
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	0	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: EYE: EYE INJURIES (GENERAL)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating should decline	
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	+	
25	-	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	0	
35	+	
37	-	
38	no rating	
Unknown	0	
Unknown	+	

Indicator:

PENETRATING EYE INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	should decline
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	0	
25	-	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	0	
35	+	
37	-	
38	no rating	
Unknown	dk	
Unknown	+	

Indicator: PARTIAL/PERMANENT LOSS OF VISUAL ACULTY

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	should decline
7	0	
8	+	
9	-	
12	+	
13	-	
18	+	
19	0	
25	-	
26	-	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	0	look at linked police accident reports - hospital adm. records in Great Britain, possibly New York state, new legally blind pattern
35	0	
37	-	
38	no rating	
Unknown	dk	
Unknown	-	

Indicator: EAR (INCLUDING INNER ORGANS)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	
7	0	
8	0	
9	-	
12	+	
13	-	
18	+	
19	0	
25	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	-	poorly reported
35	0	
37	-	
38	no rating	
Unknown	0	
Unknown	0	

Indicator: MOUTH: FRACTURED MANDIBLE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	should decline
7	0	
8	+	
9	-	
12	+	
13	-	
18	+	
19	+	
25	+	studied at UT Medical Ctr -Knoxville & presented Jan '89 copy attached & abstract
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	0	
35	+	
37	-	
38	no rating	
Unknown	dk	
Unknown	+	

Indicator: TYPE/NATURE OF DENTAL REPAIRS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating should decline	
7	0	
8	0	
9	+	
12	+	
13	0	
18	+	
19	+	
25	+	
26	+	
27	+	
28	0	
29	NR	
30	dk	
31	+	availability
33	-	poorly reported
35	+	
37	-	
38	no rating	
Unknown	dk	
Unknown	0	

Indicator:

NECK (INCLUDES WHIPLASH)

Expert	Rating	Comments
1	no rating	
2	dk	
4	no rating	
5	no rating	
7	+	
8	0	
9	+	
12	+	
13	-	
18	+	
19	0	
25	+	
26	-	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	-	no bottom line
35	+	
37	no rating	whiplash-no/quadruplegia-ok
38	no rating	
Unknown	0/+	big shift toward soft tissue injury expected as consequence of SBUL
Unknown	+	

Indicator: THROAT

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	no rating	
7	0	
8	+	
9	-	
12	+	
13	-	
18	-	
19	+	
25	-	
26	-	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	-	too infrequent
35	0	
37	-	
38	no rating	
Unknown	0/+	big shift toward soft tissue injury expected as consequence of SBUL
Unknown	+	

Indicator:

BELT-INDUCED INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	+	
4	no rating	
5	+	sure, but how can one tell?
7	+	
8	+	
9	+	
12	+	
13	+	
18	+	
19	+	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	-	preferable to specify and document injuries and afterwards attempt to assess the role of the belt in the causation of some
33	+	combination based on clavicle force and sternum and ribs - require police accident report
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: CHEST ORGAN INJURIES (HEART/LUNG)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	dk	
7	0	
8	+	
9	+	
12	+	
13	0	
18	-	
19	+	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	-	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: CHEST WALL

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	dk	
7	0	
8	+	
9	+	
12	+	
13	0	
18	-	
19	0	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	
33	-	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: BRUISED/FRACTURED STERNUM

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	
7	0	
8	+	
9	+	
12	+	
13	+	
18	+	
19	0	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	would be better as fractured sternum bruising to be entered as bruised chest wall
33	+	see note attached
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator:

BRUISED/FRACTURED RIBS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	
7	0	
8	+	
9	+	
12	+	
13	+	
18	+	
19	+	
25	no rating	
26	+	
27	+	
28	+	
29	NR	
30	dk	
31	+	fractured ribs - bruising - chest wall. Ideally one would want the exact ribs broken, i.e., whether L or R and which ribs
33	+	see note attached
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: ABDOMEN (INCLUDES KIDNEYS, SPLEEN AND LIVER)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	
7	+	
8	+	
9	+	
12	+	
13	0	
18	-	
19	+	
25	+	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	+	"lap belt injury" cross abdomen...see note attached - injuries not unique to safety belt(SB) use
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: PELVIC ORGANS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	
7	+	
8	+	
9	+	
12	+	
13	0	
18	-	
19	+	
25	-	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	-	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: CERVICAL SPINE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	yes, might respond but in which direction? Will increased belt use increase or decrease than?
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	+	
25	+	
26	dk	
27	+	the resultant redistribution of injuries according to AIS85 will show increased percentage when belted vs. unbelted, but AIS score less in belted
28	+	
29	NR	
30	dk	
31	+	damage to skeleton and no spinal cord needs to be identified
33	+	I think but am not certain about relation- ship to SB use
35	+	
37	-	
38	no rating	
Unknown	0/+	chance fractures & rear seat belted occupants
Unknown	+	

Indicator: THORACIC SPINE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	NR	
4	no rating	
5	+	response direction unknown
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	0	
25	+	
26	dk	
27	+	
28	+	
29	NR	
30	dk	
31	+	damage to skeleton and to spinal cord needs to be identified
33	+	
35	+	
37	-	
38	no rating	
Unknown	0/+	chance fractures & rear seat belted occupants
Unknown	+	

Indicator: LUMBAR SPINE

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	+	response direction unknown
7	0	
8	+	
9	+	
12	+	
13	0	
18	+	
19	0	
25	+	
26	dk	
27	+	
28	+	
29	NR	
30	dk	
31	+	damage to skeleton and to spinal cord needs to be identified
33	+	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: UPPER EXTREMITIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	dk	
7	0	
8	+	
9	+	
12	+	
13	0	
18	-	
19	-	
25	-	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	Laterality is valuable as well as specific bones, joints, etc.
33	-	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator: LOWER EXTREMITIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	dk	
7	0	
8	+	
9	+	
12	+	
13	0	
18	-	
19	+	
25	+	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	+	useful if scaled for severity
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator:

PELVIS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	dk	
4	no rating	
5	dk	
7	0	
8	+	
9	+	
12	+	
13	0	
18	-	
19	-	
25	-	
26	dk	
27	+	
28	0	
29	NR	
30	dk	
31	+	
33	no rating	
35	+	
37	-	
38	no rating	
Unknown	0/+	
Unknown	+	

Indicator:

EXPECTED VS. ACTUAL NUMBER OF INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	0	
4	+	vital
5	+	
7	+	
8	+	
9	+	
12	+	
13	+	
18	+	
19	0	how do you establish expected number
25	+	
26	+	
27	+	
28	+	
29	+	plus types restrained & unrestrained
30	+	by injury category (e.g., fatal, serious moderate, minor)
31	+	expected vs. actual number of deaths
33	dk	
35	+	
37	+	
38	+	
Unknown	0/+	
Unknown	+	

Indicator:

NUMBER OF LIVES SAVES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	
2	0	
4	+	
5	+	
7	+	
8	+	
9	-	
12	+	
13	dk	
18	+	
19	+	
25	+	
26	+	
27	+	
29	+	
30	0	
31	+	
33	+	limited by small numbers
35	+	
37	+	
38	+	
Unknown	0/+	
Unknown	+	

Indicator: NUMBER OF NONINJURY CRASHES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	+	
4	-	Counterintuitive: higher wearing rates should correct some injury accidents to non-injury accidents
5	0	doubtful
7	+	
8	+	
9	+	
12	+	
13	NR	
18	-	
19	-	
25	+	
26	+	
27	+	
28	+	
29	+	Fundamental info. that nobody seems to have. Major difficulty would be in establishing baseline
30	+	as proportion of all crashes
31	dk	
33	+	non-uniform reporting
37	-	
38	+	
Unknown	0/+	
Unknown	+	

Indicator:

MEMBERSHIP CHANGES IN ORGANIZATION SERVING
PEOPLE DISABLED BY CRASH INJURIES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	use hospital discharge data
2	0	
4	-	
5	-	too general, too small, too unsensitive
7	-	
8	0	
9	-	
12	0,dk	changes could be due to many causes
13	0	
18	-	
19	+	need to identify occupants as opposed to motorcyclists
25	-	
26	-	
27	0	wide variability in local public awareness, financing, and social pressure
28	-	see note attached
29	-	
30	-	change in number of accidents, regardless of MVL, effect these indicators
31	dk	
33	-	too late to be useful takes 1 to 3 years
35	0	
37	-	
38	0	
Unknown	dk	
Unknown	0	

Indicator: SALES VOLUME OF ADAPTIVE DEVICES FOR VEHICLES OF
DISABLED PERSONS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	E coding critical
2	0	
4	-	
5	-	too small, general & insensitive
7	-	
8	0	
9	dk	
12	0, dk	changes could be due to many causes
13	-	
18	-	
19	-	
25	0	
26	-	marketing and affordability variable confounding
28	-	too insensitive
29	-	
30	-	
31	dk	
33	-	too late to useful takes 1 to 3 years
35	0	
37	-	
38	-	
Unknown	0	
Unknown	0	

Indicator:

TREATMENT COST OF REHABILITATION

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	+	
2	0	
4	+	of interest if adequate data are available
5	-	too insensitive general
7	0	
8	+	tough to get
9	dk	
12	0	changes could be due to many causes
13	0	
18	+	
19	-	
25	0	
26	+	
27	+	
28	0	too insensitive
29	0	
30	-	
31	dk	
33	0	
35	0	
37	no rating total cost ok	
38	-	
Unknown	0/+	
Unknown	+	

Indicator: INCIDENCE OF SECONDARY CONSEQUENCE FOR EXAMPLE:
 CRASH-RELATED EPILEPSY POST BLOOD TRANSFUSION
 HEPATITIS PAIN - KILLER ADDICTIONS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	no rating	very difficult - questionable reliability
2	0	
4	-	
5	-	too insensitive
7	-	
8	0	
9	-	
12	0	changes could be due to many causes
13	0	
18	-	
19	-	
25	-	
26	0	
27	+	
28	-	too insensitive
29	-	
30	-	
31	dk	
33	-	not uniformly reported
35	0	
37	-	
38	-	
Unknown	0/+	
Unknown	0	

Indicator: FREQUENCY/PERCENT INSURANCE COLLISION INJURY CLAIMS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	0	
2	0	
4	+	useful to counter risk compensation' claims of greater driver security leading to riskier driving and more accidents
5	+	maybe
7	+	
8	+	
9	+	
12	+	
13	+	
18	-	
19	-	
25	+	
26	+	
27	+	
28	+	
29	NR	
30	+	
31	+	
33	dk	
35	0	
37	+	
38	+	
Unknown	0/+	
Unknown	+	

Indicator:

SAFETY BELT REPLACEMENT CLAIMS/PAID CASES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	0	
4	-	
5	0	
7	+	
8	dk	
9	dk	
12	0, dk	
13	+	
18	-	
19	-	
25	0	very limited use, if any
26	+	
27	0	
28	-	
29	NR	
30	dk	
31	dk	
33	dk	
35	0	
37	-	
38	-	
Unknown	dk	
Unknown	+	

Indicator:

WINDSHIELD REPLACEMENT/DAMAGE CLAIMS

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	0	
4	-	
5	-	probably not; most vs. damage probably not occupant caused
7	0	
8	0	
9	+	
12	0, dk	
13	+	
18	-	
19	-	
25	0	
26	+	
27	+	
28	-	
29	NR	
30	-	
31	dk	
33	dk	aren't most windshields broken by flying rocks
35	0	
37	-	
38	+	
Unknown	dk	
Unknown	+	

Indicator: INCREASED NUMBER OF CASES

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	-	
2	+	
4	dk	
5	+	yes
7	+	
8	-	
9	dk	don't understand this
12	+	
13	-	
18	-	
19	-	
25	-	
26	-	
27	0	reflects legal community aggressiveness more than belt uses
28	-	
29	NR	
30	0	
31	dk	sounds possible, but don't know enough about it
33	-	too many confounding factors
35	0	
37	-	
38	+	
Unknown	dk	
Unknown	+y	

Indicator:

INJURY PATTERNS BY OCCUPANT COMPARTMENT PARTS
(E.G., STEERING WHEEL, DASH)

<u>Expert</u>	<u>Rating</u>	<u>Comments</u>
1	0	
2	+	
4	0	
5	+	maybe
7	+	
8	+	
9	+	
12	dk	
13	0	
18	+	
19	-	
25	0	
26	-	
27	+	
28	-	
29	NR	
30	0	
31	dk	
33	-	data source?
35	+	
37	-	
38	+	
Unknown	0/+	
Unknown	+	

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PART C

INDICATOR CATALOG

[See page C-53 for an index of indicators included in Part C.]



indicator	ejections
indicator desc.	number or rate of persons thrown or partially thrown from the vehicle through windows or door or other openings due to forces of a crash as reported by police or other on-site data collection
reviewer	Landes/Miller
validity	medium
v-associated	yes, consistently shown that significantly fewer ejections among belted occupants
v-causally	questionable
v-temporally	questionable
v-other factors	yes
v-which others	direction of impact, seating position, improved vehicle and windshield design, possibly airbags
v-how influenced	higher incidence of ejection of unbelted occupants in rollovers and lateral impact. one study suggested unbelted rear occupants more prone to ejection.
v-compensated for	match for direction of impact or watch impact direction mix and vehicle design for substantial changes
objectivity	high
o-phys. evidence	yes, so called "partial ejections", however, become more subjective
usefulness	high
u-legislators	yes, correlated with fatalities and severe injuries
u-positive	yes, fewer fatalities, less severe injuries when not ejected
u-negative	no
u-tabulated	yes, generally ejection information is noted in an accident report; if not specific item, then part of narrative.
sensitivity	low
s-how much change	although highly related to belt use, change in usage rates because of laws among those especially at risk of ejection may be low
generalizability	medium
g-valid generaliz.	ejection situations may not be typical
feasibility	medium
f-data collection	yes, defined fairly easily but relies on police or onsite data collection
f-special knowledge	only in cases of "partial ejection". need criteria to establish exactly what this is.
comments	

indicator	neurosurgical consultation (post motor-vehicle crash)
indicator desc.	ratios of belted vs. nonbelted so that values less than unity (<1) suggest a desirable effect of seat belt use
reviewer	Race
validity	high
v-associated	belted occupants associated with statistically significant fewer cases required consultation
v-causally	yes
v-temporally	not known
v-other factors	assumes one knows belt use and nonuse
v-which others	assumes accuracy between belt use and nonuse cases
v-how influenced	
v-compensated for	
objectivity	high
o-phys. evidence	
usefulness	high
u-legislators	
u-positive	yes
u-negative	no
u-tabulated	not known
sensitivity	high
s-how much change	not known
generalizability	high
g-valid generaliz.	yes
feasibility	high
f-data collection	
f-special knowledge required	detailed medical service information
comments	

indicator	surgical operations (post motor-vehicle crash)
indicator desc.	ratio of belted vs. nonbelted cases so that values less than unity (<1) suggest a desirable effect of safety belt use
reviewer	Race
validity	high
v-associated	belted occupants were associated with statistically significant fewer cases requiring post-crash surgery
v-causally	yes
v-temporally	doesn't need to be to be useful
v-other factors	assumes one knows. have accurately identified
v-which others	belt use/nonuse cases
v-how influenced	
v-compensated for	
objectivity	high
o-phys. evidence	
usefulness	high
u-legislators	
u-positive	yes
u-negative	
u-tabulated	
sensitivity	high
s-how much change	
generalizability	high
g-valid generaliz.	
feasibility	high
f-data collection	
f-special knowledge	
comments	

indicator all head injuries to front seat occupants, excluding drivers with severity > AIS 2

indicator desc.

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others interior design (steering wheel, airbags, types of impact)

v-how influenced improved design may lessen head injuries and severity

v-compensated for need to periodically compare statistics for seat belt users and nonusers

objectivity high

o-phys. evidence yes

usefulness high

u-legislators yes, life-threatening injuries, disabilities

u-positive yes, significant reduction with seat belt usage, 50 % or more

u-negative

u-tabulated widely available

sensitivity high

s-how much change up to 7 fold reduction with safety belt usage

generalizability high

g-valid generaliz. yes

feasibility high

f-data collection yes

f-special knowledge physicians, nurses, medical records clerks

comments includes all head injuries in front seat passengers, and also injuries < AIS 3 in drivers.

This will show benefits that are masked by steering wheel injuries or other factors that seem to increase severe head injuries in drivers despite seat belt use.

indicator	face injuries	periodic controls	feasibility
indicator desc.	all injuries to face, AIS > 1, excludes eye.		feasibility
reviewer	Benjamin		
validity	high		
v-associated	yes		
v-causally	yes		
v-temporally	yes		
v-other factors	yes		
v-which others	steering wheel design, airbags, position in vehicle (driver or front seat passenger)		
v-how influenced	steering wheel poses high risk for belted driver		
v-compensated for	tabulate passengers separately from drivers. periodic controls of belted versus unbelted.		
objectivity	high		
o-phys. evidence			
usefulness	high		
u-legislators	most common injury, cosmetic effects important		
u-positive	yes		
u-negative			
u-tabulated	yes		
sensitivity	medium		
s-how much change	studies on facial fractures show minimal improvement. overall face injuries show marked improvement.		
generalizability	high		
g-valid generaliz.			
feasibility	high		
f-data collection			
f-special knowledge	medical clerk		
comments			

indicator	upper extremities
indicator desc.	injuries to upper arm and forearm, AIS > 1. does not include hand or wrist
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	seating position -- driver or passenger
v-how influenced	unrestrained passengers seem to be more at risk, therefore show more improvement with law
v-compensated for	can restrict indicator to front seat passengers
objectivity	medium
o-phys. evidence	reports differ as to what constitutes upper extremity
usefulness	medium
u-legislators	usually results in temporary disability
u-positive	yes
u-negative	
u-tabulated	useful in some data bases, others not well defined
sensitivity	medium
s-how much change	not all studies show significant change
generalizability	high
g-valid generaliz.	with proper definition
feasibility	high
f-data collection	
f-special knowledge	medical clerk
comments	reports vary in precision of "arm" or "upper extremity" definition and also in types of injury tabulated as fracture, soft tissue, etc. It appears that with precise definition, belt use laws and belt use will be reflected by improvement in this indicator.

indicator	lower extremities
indicator desc.	lower extremity injuries, AIS > 1, excluding ankles and feet
reviewer	Benjamin

validity	medium
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	unclear
v-which others	
v-how influenced	
v-compensated for	

objectivity	high
o-phys. evidence	

usefulness	medium
u-legislators	will include some permanent disability
u-positive	equivocable
u-negative	
u-tabulated	poor definition

sensitivity	low
s-how much change	many studies show no change

generalizability	
g-valid generaliz.	

feasibility	high
f-data collection	
f-special knowledge	medical clerk

comments	literature does not give strong support for this indicator.
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indicator	Abbreviated Injury Scale (AIS)
indicator desc.	includes MAIS, ISS. frequency or percent of AIS cases. injury classification system that when fully used describes the injury by body part, type and severity.
reviewer	Race
validity	high
v-associated	yes
v-causally	yes
v-temporally	
v-other factors	yes
v-which others	
v-how influenced	
v-compensated for	assessment made without knowledge of belt use
objectivity	high
o-phys. evidence	standardize procedure. approximately "universal" usage
usefulness	high
u-legislators	yes
u-positive	yes
u-negative	
u-tabulated	very common in medical literature
sensitivity	
s-how much change	
generalizability	high
g-valid generaliz.	
feasibility	high
f-data collection	yes
f-special knowledge	requires AIS knowledge. data file may already be coded
comments	<p>this is a classification system. it is used to describe the nature and severity of motor-vehicle related trauma. it is a means to an end and not an indicator per se.</p> <p>good as a classification of the life-threatening nature of injuries but not disability, rehabilitation or duration of injury consequence.</p>

indicator	frequency/per cent of multiple injury cases
indicator desc.	generally used when assessing injury patterns or the effect of belts or laws on same. may have potential as a way of identifying motor-vehicle related injury cases
reviewer	Race
validity	high
v-associated	
v-causally	yes
v-temporally	depends on data base
v-other factors	yes
v-which others	injuries due to vehicle deformation, steering wheel, dashboard, door pillars (B)
v-how influenced	
v-compensated for	improved vehicle design. maintain the integrity of the occupant compartment
objectivity	high
o-phys. evidence	
usefulness	high
u-legislators	
u-positive	yes
u-negative	
u-tabulated	
sensitivity	
s-how much change	
generalizability	high
g-valid generaliz.	
feasibility	high
f-data collection	
f-special knowledge	
comments	

indicator	general shifts in frequency of injury cases or distribution by severity
indicator desc.	strong evidence in European literature that belts reduce the number of injuries and the severity of injury
reviewer	Race/Hoskin
validity	high
v-associated	yes
v-causally	yes
v-temporally	depends on available data base
v-other factors	yes
v-which others	vehicle deformation
v-how influenced	occupants collide with vehicle interior because of crushing of compartment
v-compensated for	improved vehicle design, information on vehicle itself determining change in velocity
objectivity	high
o-phys. evidence	yes
usefulness	high
u-legislators	yes
u-positive	yes
u-negative	sometimes studies report an increase in minor injuries
u-tabulated	depends on record keeping system
sensitivity	medium
s-how much change	not known
generalizability	high
g-valid generaliz.	depends on scope of record keeping system
feasibility	high
f-data collection	usually through trauma registry; can use police reports.
f-special knowledge medical,	unless already coded
comments	

indicator	head injuries, excluding ear, eye, and face
indicator desc.	cranium injuries, anatomic lesions, and non-anatomic (concussive) injuries
reviewer	Benjamin/Planek
validity	high
v-associated	yes, head injuries due to occupant ejections and projection into the windshield, etc., should be prevented by belts so that frequency and severity are reduced
v-causally	yes, observed differences in head injury frequency, severity, and patterns among belted and unbelted occupants are robust enough to appear in belt law research
v-temporally	it can be, but records must be available, preferably including uniform severity code as well as victim seating position
v-other factors	yes
v-which others	severity of impact (delta V), angle of collision, seating position, changes in interior car design, introduction of airbags, raising of 55 mph speed limit
v-how influenced	changes in one or a combination of these variables in post vs. pre-belt law periods can increase or dampen the effects
v-compensated for	use comparison groups, check experience of belt users and non-users periodically
objectivity	high
o-phys. evidence	yes, but training in AIS coding, etc., would be necessary
usefulness	high
u-legislators	yes, it should be. head injuries are life-threatening and can cause major disability and are potentially high cost medical problems
u-positive	yes, reductions in the neighborhood of 50 % or more
u-negative	belted driver injury due to steering wheel contact at high impacts could produce some negative results
u-tabulated	yes, head injury data usually available in hospital records but storage and uniformity of data are questionable
sensitivity	high
s-how much change	questionable. some indication that nonbelt wearers more likely in crashes. even so, sensitivity should be high, especially if limited to drivers and front pass. AIS <= 2.
generalizability	high
g-valid generaliz.	yes, providing the study sample is statistically representative
feasibility	medium
f-data collection	yes, but training necessary to use AIS coding
f-special knowledge	yes, physicians, nurses, medical records clerk
comments	

indicator	ratio of head injuries to cervical sprain or whiplash
indicator desc.	all head injuries, injuired to neck designated as strain, sprain, or whiplash
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	head rests
v-how influenced	head rests offer protection against cervical sprain
v-compensated for	periodic study of belted versus nonbelted
objectivity	medium
o-phys. evidence	cervical sprain diagnosed by symptoms which may be delayed
usefulness	high
u-legislators	represents head injuries saved
u-positive	yes
u-negative	not as defined
u-tabulated	yes
sensitivity	high
s-how much change	even with probable underreporting of cervical strain, reports give high improvement for index
generalizability	high
g-valid generaliz.	
feasibility	high
f-data collection	
f-special knowledge	medical clerk
comments	Three-point restraints protect head against impact by transferring stress to neck. Neck structures at risk are ligaments and muscles rather than central nervous system, as is the case with head injuries.

indicator	lung injuries
indicator desc.	hemothorax, pneumothorax, pulmonary contusions (x-ray diagnosis)
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	interior design, steering wheel, dashes, clothing, seating position
v-how influenced	new design should reduce incidence
v-compensated for	periodic comparisons of seat belt use and non-seat belt use statistics
objectivity	high
o-phys. evidence	yes, x-ray
usefulness	high
u-legislators	yes, life threatening
u-positive	yes
u-negative	
u-tabulated	yes
sensitivity	high
s-how much change	significant changes with seat belt laws
generalizability	medium
g-valid generaliz.	total incidence low
feasibility	high
f-data collection	yes, x-ray criteria
f-special knowledge	medical
comments	could be useful indicator. need large accident base because of low incidence

indicator	treatment cost of rehabilitation (spinal cord injuries)
indicator desc.	average annual cost (or projected total cost) of spinal cord injury incurred with and without safety belt
reviewer	Hoskin
validity	high
v-associated	yes
v-causally	yes, provided that medical record includes E-code or equivalent
v-temporally	yes, depending on data source
v-other factors	yes
v-which others	crash configuration, vehicle body style, presence of degenerative bone disease, etc.
v-how influenced	can increase severity of injury in spite of seat belt use
v-compensated for	if confounding factors are included in medical/rehab record, then they can be controlled statistically
objectivity	high
o-phys. evidence	yes, costs recorded in medical/rehab files
usefulness	high
u-legislators	yes, much of rehab cost comes from public funds
u-positive	no
u-negative	yes
u-tabulated	no
sensitivity	medium
s-how much change	probably moderately sensitive if adjusted for inflation
generalizability	high
g-valid generaliz.	spinal cord injury rehab costs are probably similar nationwide
feasibility	high
f-data collection	yes, easily
f-special knowledge	no, only examination of existing records
comments	document #45 was prime source. similar spinal cord registries could obtain similar data

indicator motor-vehicle related admissions

indicator desc.

reviewer Fearn

validity medium

v-associated yes

v-causally no

v-temporally yes

v-other factors yes

v-which others traffic density, general trends in other use groups, admissions policy

v-how influenced they also influence injury severity and thus number of admissions

v-compensated for collect data on other factors, compare direction and magnitude with vehicle occupant data

objectivity high

o-phys. evidence yes, hospital records

usefulness high

u-legislators yes

u-positive yes

u-negative

u-tabulated yes

sensitivity high

s-how much change probably not too much. some studies indicate an admission rate 3.5 times higher for
unbelted than belted

generalizability

g-valid generaliz.

feasibility high

f-data collection yes

f-special knowledge no

comments

indicator	spinal cord injury
indicator desc.	all spinal cord injuries resulting in permanent neurologic impairment
reviewer	Benjamin
validity	medium
v-associated	although belts protect against ejection and compartment impact, they directly stress the spine, especially the neck
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	compartment design, EMS handling
v-how influenced	trend to improvement independent of belt use laws
v-compensated for	periodic controls of belted versus unbelted
objectivity	high
o-phys. evidence	
usefulness	high
u-legislators	
u-positive	yes
u-negative	
u-tabulated	no, spinal cord registries do not give belt use or crash data. difficult to relate to individual state belt laws
sensitivity	low
s-how much change	incidence of cases very low
generalizability	low
g-valid generaliz.	no
feasibility	medium
f-data collection	present spinal registry center not interested
f-special knowledge	medical clerk
comments	subject of special registry. high legislative impact.

indicator	fractured sternum
indicator desc.	fracture of sternum by x-ray. bruised sternum, not well defined diagnosis
reviewer	Benjamin
<hr/>	
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	interior design, steering wheel, protuberances, clothing, position
v-how influenced	trend is to diminish
v-compensated for	compare seat belt use and non-use statistics periodically
<hr/>	
objectivity	
o-phys. evidence	need x-ray, unlikely to be reported without x-ray
<hr/>	
usefulness	medium
u-legislators	yes
u-positive	direct effect of seat belt restraint, reciprocal of more serious injuries
u-negative	definite increase in sternal injury with seat belt
u-tabulated	yes
<hr/>	
sensitivity	high
s-how much change	100% to 150% increase
<hr/>	
generalizability	high
g-valid generaliz.	yes
<hr/>	
feasibility	high
f-data collection	yes
f-special knowledge	medical
<hr/>	
comments	very useful for gauging compliance. not good argument for legislation.

indicator	number treated vs. number admitted
indicator desc.	number (proportion or percentage) of MV accident victims treated vs. admitted
reviewer	Fearn
validity	medium
v-associated	yes
v-causally	no
v-temporally	yes
v-other factors	yes
v-which others	any factor affecting crash severity: traffic density, vehicle miles, no. of vehicles, average speeds, changes in speed laws, crash config., varying admissions policies (HMO)
v-how influenced	they could change the balance of those just treated vs. those admitted
v-compensated for	careful selection of study population; examination of trends in other road user groups
objectivity	high
o-phys. evidence	yes
usefulness	high
u-legislators	yes, indicator of less demand for medical services, i.e. less severe injuries
u-positive	yes
u-negative	
u-tabulated	yes
sensitivity	medium
s-how much change	moderate increases in belt use appear to produce significant changes in the indicator.
generalizability	high
g-valid generaliz.	yes
feasibility	high
f-data collection	yes
f-special knowledge	no
comments	

indicator	average medical treatment costs
indicator desc.	acute care costs for safety belt use vs. nonuse, and admitted vs. treated and released
reviewer	Hoskin
validity	high
v-associated	yes
v-causally	yes, provided that medical record indicates motor-vehicle trauma
v-temporally	yes
v-other factors	yes
v-which others	seating position, speed, vehicle make/model/size, crash configuration, etc.
v-how influenced	can affect injury severity
v-compensated for	can be controlled statistically if the confounding variables are identified
objectivity	high
o-phys. evidence	yes, medical record information
usefulness	medium
u-legislators	yes, a portion of costs come from public funds (medicaid)
u-positive	no
u-negative	yes
u-tabulated	no, only through special studies
sensitivity	medium
s-how much change	due to confounding factors and inflation, not too sensitive
generalizability	high
g-valid generaliz.	yes
feasibility	high
f-data collection	yes, a set of cost elements could be agreed upon.
f-special knowledge	no, extracted from existing medical and accounting data.
comments	the number of confounding factors is the biggest drawback to this indicator.

indicator penetrating eye injuries

indicator desc. eyes injuries AIS > 1

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others shatter proof windshields, seat belts

v-how influenced does not protect against flying glass

v-compensated for periodic study of belted vs. nonbelted

objectivity high

o-phys. evidence yes

usefulness high

u-legislators yes, loss of vision

u-positive yes

u-negative

u-tabulated yes

sensitivity high

s-how much change

generalizability high

g-valid generaliz.

feasibility high

f-data collection yes

f-special knowledge medical clerk

comments although incidence is relatively low, data can be collected from eye centers to give large enough number for significant results.

indicator	injury patterns by occupant compartment parts
indicator desc.	injuries due to contact with interior vehicle components
reviewer	Landes
validity	high
v-associated	yes, there are definite injury pattern differences between belted/unbelted (as well as driver/passenger)
v-causally	not a simple cause/effect. more of a shift in patterns or mix.
v-temporally	yes, in terms of injury "mix" changes
v-other factors	no
v-which others	
v-how influenced	
v-compensated for	
objectivity	medium
o-phys. evidence	yes, based on injuries themselves, or injuries and vehicle interior damage. need for judgement in many cases
usefulness	high
u-legislators	yes, both in terms of seat belt use and vehicle interior damage
u-positive	yes, decrease in certain injuries
u-negative	yes, also seat belt specific injuries
u-tabulated	not known, many sources
sensitivity	high
s-how much change	any change should produce corresponding change in injury data
generalizability	high
g-valid generaliz.	yes
feasibility	medium
f-data collection	yes
f-special knowledge	yes, knowledge of injury/vehicle part correspondence
comments	<p>the indicator does not in itself appear to be a useful indicator. this is because injuries are generally enumerated first, and then inferences are made concerning the passenger compartment part responsible for the injury. (although not always stated outright, some studies appeared to combine injury information with vehicle interior damage to ascertain the vehicle part/injury type relationship).</p> <p>it seems that the best strategy may be to consider the vehicle part as a factor of certain injury types e.g. chest injuries/steering wheel. there are several fairly specific injury/vehicle part combinations that would be useful in seat belt use evaluation. several important ones noted in the literature are: chest/steering wheel, face/steering wheel, head/interior side or roof, shoulder or chest or pelvis or abdomen/restraint system, face/instrument panel, eye/windshield, face/auto glass, neck/seat belts, hip/dashboard. see original copy of indicator profile for references numbers of articles dealing with each combination.</p>

indicator	passenger compartment damage
indicator desc.	damage to actual vehicle compartment components from occupant contact as an indicator of seat belt use
reviewer	Landes
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	direction of impact
v-how influenced	different occupant-compartment collisions result from different external collision directions
v-compensated for	analysis of external vehicle damage to ascertain direction of impact
objectivity	high
o-phys. evidence	yes, interior compartment damage
usefulness	medium
u-legislators	only indirectly
u-positive	yes
u-negative	no
u-tabulated	no
sensitivity	high
s-how much change	any change in belt use would produce obvious changes
generalizability	high
g-valid generaliz.	yes, with seat belt use
feasibility	medium
f-data collection	yes
f-special knowledge	yes, knowledge of occupant-compartment injury patterns
comments	<p>while reviewing the literature covering vehicle parts for the indicator "injury patterns by occupant compartment parts", it became apparent that passenger compartment damage may be a useful indicator of seat belt use.</p> <p>none of the literature reviewed enumerated indicents of interior vehicle damage. rather, the injuries were used as evidence to deduce the component of the vehicle with which the body contact was made. in some cases, the injury information was compared with observed passenger compartment damage to establish the area of body contact.</p> <p>it seems that an examination of the vehicle passenger compartment alone would permit valid conclusions concerning occupant seat belt use. consequently, although passenger compartment damage as an indicator in itself is not noted in the literature, it should be considered as a viable, potential indicator of seat belt use.</p>

indicator	spinal fractures, sprains
indicator desc.	exclude cervical sprains, diagnosis by x-ray of symptoms
reviewer	Benjamin
validity	medium
v-associated	yes
v-causally	mechanisms obscure
v-temporally	yes
v-other factors	not known
v-which others	passenger-to-passenger interaction
v-how influenced	
v-compensated for	
objectivity	high
o-phys. evidence	symptoms, fairly well defined
usefulness	
u-legislators	yes
u-positive	no
u-negative	yes, sprains of low back up 100%-300%
u-tabulated	yes
sensitivity	high
s-how much change	sprains of low back up 100%-300% for front seat drivers
generalizability	medium
g-valid generaliz.	overall incidence low
feasibility	high
f-data collection	yes
f-special knowledge	medical
comments	strong negative indicator of low incidence. mechanisms not clear. may not be constant in various studies. poor indicator.

indicator number/percent of cases transported by ambulance

indicator desc.

reviewer Fearn

validity medium

v-associated yes, increase in belt use should result in decrease in need for ambulance services

v-causally no

v-temporally yes

v-other factors yes

v-which others traffic conditions, seasonality, trends in ambulance runs for other road user groups

v-how influenced could influence difference in number of runs over two observation periods, masking the true effect of the seat belt use law

v-compensated for control data collection timing and sampling plan; collect data on other user groups

objectivity high

o-phys. evidence yes, although determination of belt use is often self-reported

usefulness high

u-legislators yes, it's a gauge of seat belt effectiveness and the demand for medical services

u-positive yes, effect of seat belt in mitigating serious injury

u-negative no

u-tabulated unsure, the reviewed literature consisted of special studies, although number of runs may be routinely kept

sensitivity medium

s-how much change with belts about 50% effective in preventing the types of injuries which would require a run, it would appear only a moderate increase in use would produce a significant change.

generalizability medium

g-valid generaliz. yes, regarding general demand for services of belted vs. nonbelted occupants

feasibility high

f-data collection yes

f-special knowledge no

comments Dagnone and Siu (#61), derived two measures to look at all facets of the demand for medical services. They are the preventive rate and the population preventive rate, which assess the proportion of service utilization among the nonbelted which would be prevented if they used belts, and the amount of service utilization which would be prevented if belt use reached 100%, respectively.

indicator	number of emergency room visits
indicator desc.	number (or percent) of crash victims who receive ER treatment
reviewer	Fearn
validity	medium
v-associated	yes
v-causally	no
v-temporally	yes
v-other factors	yes
v-which others	could possibly be influenced by traffic conditions, traffic exposure, trends in other road user groups
v-how influenced	
v-compensated for	develop data collection strategies to permit valid before/after comparisons. compare expected vs. observed trends among various road user categories.
objectivity	high
o-phys. evidence	yes, documented emergency room treatment
usefulness	high
u-legislators	yes
u-positive	yes, reduction in need for treatment, i.e. less serious injury
u-negative	no
u-tabulated	yes
sensitivity	medium
s-how much change	evidence is scant, but it appears the increase in the indicator will be 1/3 to 1/2 that of the increase in belt use
generalizability	medium
g-valid generaliz.	yes, about general injury severity of belt wearers vs. nonwearers
feasibility	high
f-data collection	yes
f-special knowledge	no
comments	

indicator	injury type (MV crash related)
indicator desc.	most common: 1) complaint of pain, 2) bleeding, 3) contusions, 4) bruises and abrasions, 5) fractures and dislocations, 6) concussions
reviewer	Race
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes, should be attainable from state MV accident data
v-other factors	yes
v-which others	subject to MV accident variations
v-how influenced	
v-compensated for	compared to state without seat belt use law, for example
objectivity	medium
o-phys. evidence	not known who makes the assessment
usefulness	high
u-legislators	
u-positive	reduction in more serious injury types
u-negative	increase in less serious injury types, "complaint of pain"
u-tabulated	
sensitivity	medium
s-how much change	
generalizability	medium
g-valid generaliz.	
feasibility	high
f-data collection	yes
f-special knowledge	no
comments	

indicator fracture of femur

indicator desc. x-ray diagnosis

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others interior design, impact absorption design

v-how influenced not known

v-compensated for not known

objectivity high

o-phys. evidence x-ray

usefulness medium

u-legislators yes

u-positive yes

u-negative

u-tabulated yes, low incidence

sensitivity medium

s-how much change 25 % decrease

generalizability medium

g-valid generaliz. not easily

feasibility high

f-data collection yes

f-special knowledge medical

comments

indicator	number of insurance claims for severe injury
indicator desc.	severe described in document #116, page 3: 1) > or = 5 days in hospital, or 2) 2 or more months off work, or 3) \$5,000 or more in medical and wage payments or 4) multiple major broken bones, internal injuries, or serious head inj.
reviewer	Hoskin
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	crash configuration, speed, seating position, etc.
v-how influenced	confounding factors affect severity
v-compensated for	can be controlled statistically
objectivity	medium
o-phys. evidence	no, information as reported on claims forms
usefulness	high
u-legislators	yes
u-positive	no
u-negative	yes, serious injury
u-tabulated	no
sensitivity	high
s-how much change	should be directly related
generalizability	medium
g-valid generaliz.	depends on characteristics of insured vehicles and drivers
feasibility	medium
f-data collection	depends on amount of detail in insurance records
f-special knowledge	no
comments	based on League General Insurance Co study (#116)

indicator post-crash consciousness of accident victim

indicator desc.

reviewer Fearn

validity medium

v-associated yes

v-causally not known

v-temporally yes

v-other factors yes

v-which others traffic conditions, other law changes e.g. decrease in speed limit, crash configuration

v-how influenced changes in these variables could influence the conscious state of accident victims

v-compensated for unsure, most reports seem to assume that the belt use group and nonbelt use group are equally affected/unaffected by these variables and thus any change is due to use change

objectivity high

o-phys. evidence yes

usefulness

u-legislators information with regard to probability of serious injury though not as "quotable" as some indicators

u-positive yes

u-negative

u-tabulated should be a part of ER reports; one study used NASS data, others were special studies

sensitivity

s-how much change not known

generalizability medium

g-valid generaliz. yes

feasibility high

f-data collection yes

f-special knowledge medical

comments

indicator fractured mandible

indicator desc. fractured mandible, x-ray diagnosis

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally no

v-other factors yes

v-which others interior design, steering wheels

v-how influenced

v-compensated for not known

objectivity high

o-phys. evidence yes, x-ray

usefulness low

u-legislators yes

u-positive not known

u-negative

u-tabulated no

sensitivity

s-how much change not known

generalizability

g-valid generaliz. not known

feasibility high

f-data collection yes

f-special knowledge medical

comments no literature or experience to judge this indicator

indicator noncontact soft tissue neck injuries

indicator desc. neck sprains, whiplash

reviewer Benjamin

validity

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others head rests

v-how influenced diminished

v-compensated for periodic comparison of seat belt use vs. non-seat belt use, because head rests are becoming universal

objectivity medium

o-phys. evidence diagnosis can be fuzzy, depends on symptoms

usefulness low

u-legislators yes, disability and expense item

u-positive no

u-negative yes

u-tabulated in trauma and insurance statistics (symptoms can be late)

sensitivity high

s-how much change appears to be significantly increased

generalizability high

g-valid generaliz. yes

feasibility high

f-data collection yes, by symptoms, persistent neck pain

f-special knowledge medical

comments limited usefulness due to negative effect of seat belt use.
ratio indicator, sprain/all neck and head injuries, would be much better.

indicator average hospital stay

indicator desc. average number of days spent at hospital by MV crash victims

reviewer Fearn

validity medium

v-associated yes

v-causally no

v-temporally yes

v-other factors yes

v-which others crash configuration, injury type/location, medical technology, course of treatment

v-how influenced factors affecting injury severity will increase average hospital stay

v-compensated for collect data from different regions, note trends in possible confounding factors

objectivity high

o-phys. evidence yes

usefulness high

u-legislators yes, directly related to injury severity or perhaps more importantly, costs.

u-positive yes

u-negative

u-tabulated yes

sensitivity low

s-how much change mixed data, some indicate rather large reduction in indicator while in others the change was not significant

generalizability medium

g-valid generaliz. unsure due to variability in data noted above

feasibility high

f-data collection yes

f-special knowledge no

comments

indicator occupant-to-occupant injuries

indicator desc. "collision" between occupants within a vehicle

reviewer Landes

validity high

v-associated yes, in multiple occupant situations

v-causally yes

v-temporally yes

v-other factors no

v-which others

v-how influenced

v-compensated for

objectivity medium

o-phys. evidence some guess work needed in certain cases to separate occupant-to-occupant injuries from other injuries (e.g. occupant-interior injuries)

usefulness medium

u-legislators not known

u-positive yes

u-negative no

u-tabulated no

sensitivity high

s-how much change any change in belt use of all occupants should produce change in indicator

generalizability medium

g-valid generaliz.

feasibility low

f-data collection not feasible as a single indicator

f-special knowledge yes, medical if injury diagnosis is used, engineering if interior vehicle damage used.

comments

indicator	kidney injury
indicator desc.	medical diagnosis in record of kidney injury (fuzzy definition)
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	interior design, steering wheel, protuberances
v-how influenced	tend to diminish with modern design
v-compensated for	periodic comparison of seat belt use and non-seat belt use statistics
objectivity	medium
o-phys. evidence	not clear
usefulness	low
u-legislators	yes
u-positive	yes
u-negative	
u-tabulated	to an extent. probably underreported. low incidence
sensitivity	medium
s-how much change	significant decrease but low incidence
generalizability	medium
g-valid generaliz.	fuzzy definition, low incidence
feasibility	high
f-data collection	yes, but this may further aggravate underreporting
f-special knowledge	medical
comments	diagnosis of kidney injury can be made on symptoms, physical exam, urinalysis, x-ray, with varying degrees of precision

indicator pelvic injuries

indicator desc. pelvic bone fractures, separations of pelvic girdle, x-ray diagnosis

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others seat design, clothing

v-how influenced not known

v-compensated for not known

objectivity high

o-phys. evidence x-ray

usefulness medium

u-legislators yes

u-positive yes, but equivocal

u-negative

u-tabulated yes

sensitivity low

s-how much change not known, low incidence

generalizability low

g-valid generaliz. no

feasibility high

f-data collection yes

f-special knowledge medical

comments

indicator	safety belt replacement claims/paid cases
indicator desc.	incidence of insurance claims or retail/wholesale sales data for replacement safety belts
reviewer	Hoskin
<hr/>	
validity	high
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	probably not
v-which others	normal wear ?, accident damage other than crashes ?
v-how influenced	
v-compensated for	
<hr/>	
objectivity	high
o-phys. evidence	yes
<hr/>	
usefulness	low
u-legislators	no
u-positive	no
u-negative	yes
u-tabulated	no
<hr/>	
sensitivity	medium
s-how much change	depends on current incidence of safety belt replacement, which is unknown
<hr/>	
generalizability	medium
g-valid generaliz.	
<hr/>	
feasibility	medium
f-data collection	yes
f-special knowledge	may require special training to distinguish causes of safety belt damage
<hr/>	
comments	no literature support.

indicator	external injuries
indicator desc.	soft tissue injuries, skin lacerations
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	no, no good baseline data
v-other factors	yes
v-which others	seating position, auto design
v-how influenced	not known
v-compensated for	
objectivity	high
o-phys. evidence	yes
usefulness	medium
u-legislators	yes
u-positive	yes
u-negative	
u-tabulated	no
sensitivity	medium
s-how much change	not known, but expect will include any slight injuries
generalizability	low
g-valid generaliz.	perhaps
feasibility	low
f-data collection	yes
f-special knowledge	medical records clerk
comments	<p>only one article.</p> <p>articles indicate that laceration rate reduced on face and extremities by seat belt use, but data on lacerations is usually absorbed by regional classification so it is difficult to retrieve statistics on just lacerations. Facial lacerations account for many facial injuries and appear under that indicator.</p>

indicator aorta rupture

indicator desc. aortic rupture with survival

reviewer Benjamin

validity high

v-associated yes

v-causally yes

v-temporally yes

v-other factors yes

v-which others clothing, position in auto, speed

v-how influenced not well defined

v-compensated for no

objectivity high

o-phys. evidence yes

usefulness low

u-legislators yes

u-positive not known

u-negative not known

u-tabulated no

sensitivity low

s-how much change no change in literature

generalizability low

g-valid generaliz. no

feasibility high

f-data collection yes

f-special knowledge medical

comments poor indicator. no significant change with seat belt use laws. most cases are fatal.

indicator leg and ankle fractures

indicator desc. x-ray diagnosis

reviewer Benjamin

validity high

v-associated yes

v-causally not known

v-temporally yes

v-other factors yes

v-which others interior design, increased impact resistance

v-how influenced not known

v-compensated for

objectivity high

o-phys. evidence yes

usefulness low

u-legislators yes

u-positive

u-negative equivocal

u-tabulated yes, low incidence

sensitivity low

s-how much change

generalizability low

g-valid generaliz. no

feasibility high

f-data collection yes

f-special knowledge medical

comments poor indicator.

indicator	windshield replacement/damage claims
indicator desc.	incidence of insurance claims or retail/wholesale sales data for replacement windshields
reviewer	Hoskin
<hr/>	
validity	medium
v-associated	yes
v-causally	yes, but not necessarily directly
v-temporally	yes
v-other factors	yes
v-which others	other causes of windshield damage such as stones or vandalism
v-how influenced	same resulting damage
v-compensated for	may not be able to compensate
<hr/>	
objectivity	high
o-phys. evidence	yes
<hr/>	
usefulness	low
u-legislators	no
u-positive	no
u-negative	yes
u-tabulated	no
<hr/>	
sensitivity	medium
s-how much change	depends on how many crashes result in windshield damage
<hr/>	
generalizability	medium
g-valid generaliz.	
<hr/>	
feasibility	medium
f-data collection	yes
f-special knowledge	may require special training to distinguish causes of damage to windshields
<hr/>	
comments	no literature support.

indicator	facial bone/cranium separations
indicator desc.	LeFort facial fracture classification
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	no
v-other factors	yes
v-which others	interior design, steering wheels
v-how influenced	might be influenced in future with airbags
v-compensated for	not known
objectivity	high
o-phys. evidence	yes
usefulness	low
u-legislators	yes, disfigurement disability
u-positive	yes
u-negative	
u-tabulated	no, requires detailed case study
sensitivity	
s-how much change	not known
generalizability	
g-valid generaliz.	not known
feasibility	low
f-data collection	yes, but by labor intensive effort by experts
f-special knowledge	yes, maxillofacial surgeons, x-ray technicians
comments	not practical indicator

indicator	type/nature of dental repairs
indicator desc.	not defined
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	no
v-other factors	yes
v-which others	interior car design, steering wheel, protuberances
v-how influenced	unknown
v-compensated for	unknown
objectivity	high
o-phys. evidence	yes
usefulness	low
u-legislators	yes
u-positive	not known
u-negative	
u-tabulated	no
sensitivity	
s-how much change	not known
generalizability	
g-valid generaliz.	not known
feasibility	low
f-data collection	no, perhaps insurance records
f-special knowledge	yes, dental
comments	dental records unlikely to be generated in emergency room or hospital except as part of multiple facial injuries. no data base medically, maybe insurance records. needs evaluation.

indicator	liver injury
indicator desc.	diagnosis of liver injury in medical record
reviewer	Benjamin
validity	medium
v-associated	yes
v-causally	not known
v-temporally	no
v-other factors	not known
v-which others	
v-how influenced	
v-compensated for	
objectivity	
o-phys. evidence	could be
usefulness	
u-legislators	yes
u-positive	not known
u-negative	not known
u-tabulated	no
sensitivity	
s-how much change	not known
generalizability	
g-valid generaliz.	no
feasibility	medium
f-data collection	requires intensive medical study
f-special knowledge	medical
comments	low incidence, no useful data base, not an indicator.

indicator	facial lacerations (major soft tissue injuries)
indicator desc.	appears as facial injuries in most studies. many are minor according to AIS
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	no
v-other factors	yes
v-which others	auto design, windshields
v-how influenced	
v-compensated for	no
objectivity	high
o-phys. evidence	yes
usefulness	low
u-legislators	yes
u-positive	not known
u-negative	
u-tabulated	no
sensitivity	
s-how much change	not known
generalizability	low
g-valid generaliz.	no
feasibility	low
f-data collection	no
f-special knowledge	
comments	in practice, lacerations get absorbed into other categories--facial soft tissue or facial injuries overall. literature supports only the general category facial injuries.

indicator	splenic injury
indicator desc.	medical diagnosis
reviewer	Benjamin
validity	medium
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	interior design, steering wheel, protuberances, clothing
v-how influenced	not known
v-compensated for	not known
objectivity	high
o-phys. evidence	requires surgical exploration
usefulness	low
u-legislators	yes
u-positive	equivocable
u-negative	equivocable
u-tabulated	no
sensitivity	low
s-how much change	not known
generalizability	low
g-valid generaliz.	no
feasibility	medium
f-data collection	yes, but would provide very low incidence
f-special knowledge	medical
comments	low incidence, variable correlation. poor indicator.

indicator blood transfusions

indicator desc.

reviewer Race

validity low

v-associated there is no literature link to blood transfusions

v-causally with belt use or motor-vehicle trauma

v-temporally

v-other factors yes

v-which others surgical change in patients using their own blood

v-how influenced during nonemergency surgery--biggest confounding factor

v-compensated for the effect of AIDS on blood consumption

objectivity high

o-phys. evidence linking it to motor-vehicle related use may be difficult

usefulness medium

u-legislators

u-positive yes, assuming belt use reduced need

u-negative

u-tabulated

sensitivity low

s-how much change not known

generalizability low

g-valid generaliz.

feasibility low

f-data collection

f-special knowledge

comments

indicator	chest wall
indicator desc.	not well defined. other specific sternum and rib indicators are more explicit
reviewer	Benjamin
validity	high
v-associated	yes
v-causally	yes
v-temporally	not well defined
v-other factors	yes
v-which others	position, clothing
v-how influenced	varies
v-compensated for	difficult
objectivity	medium
o-phys. evidence	may be diagnosed on symptoms alone
usefulness	low
u-legislators	yes
u-positive	
u-negative	incidence increased with seat belt use
u-tabulated	no
sensitivity	low
s-how much change	not known
generalizability	low
g-valid generaliz.	no
feasibility	low
f-data collection	no
f-special knowledge	medical
comments	subsets relating to ribs and sternum are better indicators, but have negative effects

indicator	rib fractures
indicator desc.	rib fractures, x-ray diagnosis. rib bruise--hazy term, not definable
reviewer	Benjamin
validity	medium
v-associated	yes
v-causally	yes
v-temporally	yes
v-other factors	yes
v-which others	interior design, protuberances, steering wheel, position, clothing
v-how influenced	design trends are to minimize
v-compensated for	compare seat belt use and non-use statistics periodically
objectivity	medium
o-phys. evidence	need x-ray, but clinical diagnoses are reported
usefulness	low
u-legislators	yes
u-positive	equivocable
u-negative	
u-tabulated	yes
sensitivity	low
s-how much change	not known, may not be correlated
generalizability	low
g-valid generaliz.	no
feasibility	medium
f-data collection	yes, requires routine x-ray
f-special knowledge	medical
comments	accuracy of rib fracture reporting is low. many cases not diagnosed. seat belts both protect and cause. not good indicator.

indicator	frequency of insurance injury claims
indicator desc.	claim frequency per 1,000 insured vehicle years
reviewer	Hoskin

validity	medium
v-associated	yes
v-causally	not directly
v-temporally	yes
v-other factors	yes
v-which others	age of vehicle and driver, deductible amount, etc.
v-how influenced	affects injury severity and claims incidence
v-compensated for	can be statistically controlled by standardization

objectivity	medium
o-phys. evidence	no, based on claims filed by insured

usefulness	low
u-legislators	insurance costs not a high priority issue
u-positive	yes, reduction of costs to consumers if premiums are reduced
u-negative	no
u-tabulated	no, only through special studies, e.g. #67 and #68

sensitivity	low
s-how much change	

generalizability	low
g-valid generaliz.	

feasibility	medium
f-data collection	perhaps a narrower definition would produce a better indicator
f-special knowledge	no

comments

indicator general bruising (thorax)

indicator desc. not well defined

reviewer Benjamin

validity medium

v-associated yes

v-causally in restricted circumstances

v-temporally no

v-other factors yes

v-which others interior design, clothing, position

v-how influenced complex

v-compensated for no

objectivity medium

o-phys. evidence partially, also symptoms

usefulness low

u-legislators no

u-positive not known

u-negative not known

u-tabulated no

sensitivity low

s-how much change no

generalizability low

g-valid generaliz. no

feasibility low

f-data collection no

f-special knowledge medical

comments poor indicator.

indicator	facial scars
indicator desc.	not well defined
reviewer	Benjamin
validity	low
v-associated	yes
v-causally	yes
v-temporally	no
v-other factors	yes
v-which others	auto design
v-how influenced	
v-compensated for	no
objectivity	medium
o-phys. evidence	depends on definitions--size, color, etc.
usefulness	low
u-legislators	probably
u-positive	direction of effect not known
u-negative	
u-tabulated	no
sensitivity	
s-how much change	not known
generalizability	low
g-valid generaliz.	no
feasibility	low
f-data collection	no
f-special knowledge	
comments	do not know of any data base on scars or literature relating scars to vehicular accidents.

indicator nature of disease (N) codes

indicator desc. probably most useful if linked with other factors

reviewer Race

validity

v-associated

v-causally

v-temporally

v-other factors

v-which others

v-how influenced

v-compensated for

objectivity

o-phys. evidence

usefulness

u-legislators

u-positive

u-negative

u-tabulated

sensitivity

s-how much change

generalizability

g-valid generaliz.

feasibility

f-data collection

f-special knowledge

comments this needs to be viewed as a prerequisite to identify cases. very crude as an indicator per se.

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Note: Wording of indicator may differ slightly from wording used in Volume I, Appendix D, Expert Team Ratings of Candidate Indicators, or Volume II, Appendix B, Expert Team Comments on Indicators. Wording here is the same as wording in Volume I, Appendix E, Ranked Listing of Candidate Indicators.



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